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About Our CONTRIBUTORS

PHILLIP M. CHERNOFF, D.D.S., (The Thomas W. Evans Dental Institute, University of Pennsylvania, 1922) first published in DIGEST on the subject of apicoectomy in 1940 and in 1953 presented a serial discussion of surgery versus bacteriology in the treatment of pulpless teeth. In the current issue Doctor Chernoff's title is COMPENSATING ARTICULATION OF DENTURE TEETH.

EINAR J. OLSEN, D.D.S. (Western Reserve University, School of Dentistry, 1921) is represented in a broad range of activities, both civic and professional. Doctor Olsen's first article to appear in DIGEST, A METHOD OF DRYING THE MOUTH WITHOUT THE USE OF A RUBBER DAM, is the outcome of a clinic he has given in this technique more than 20 times.

VICTOR N. JAFFE, D.D.S. (Georgetown University, School of Dentistry, 1935) holds the rank of Lt., U.S.N.R. (DC) Ret., and in addition to the publication of numerous articles and the production of motion picture films on various phases of dentistry, has appeared as essayist and clinician on denture prosthetics, crown and bridge construction, and oral rehabilitation both in the United States and Canada and abroad. Doctor Jaffe presents in the current issue the first installment of a two-part article, FULL COVERAGE AS AN APPROACH TO ORAL REHABILITATION.

ARTHUR J. KROL, D.D.S. (Chicago College of Dental Surgery, Loyola University, 1947), B.S. (Loyola University, 1948) specializes in prosthodontics. Doctor Krol has been an instructor in the Full Denture Department of Northwestern University Dental School and is at present Chairman of Prosthetic Dentistry, Loyola University Dental School. For his first appearance in DIGEST Doctor Krol publishes an article, ANATOMIC CONSIDERATIONS IN MANDIBULAR DENTURE EXTENSION.

ISAIH LEW, B.A. (University of Arkansas, 1937), D.D.S. (Thomas W. Evans Dental Institute, University of Pennsylvania, 1942) is engaged in the practice of oral surgery and prosthodontia and has published two articles previously in DIGEST on the subject of the implant denture.

EDWARD J. RYAN, B.S., D.D.S., Editor
WANDA T. PICKARD, B.A., Assistant Editor
708 Church Street, Evanston, Illinois

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Compensating ARTICULATION *of Denture Teeth*

PHILLIP M. CHERNOFF, D.D.S., Middletown, Connecticut

DIGEST

The arrangement and interrelationship of teeth in the construction of artificial dentures is perhaps the most important of all the factors determining the success of denture use. This article points out some of the reasons why many dentures are doomed to complete failure or, if tolerated by the patient, attain only a fraction of their potential utility. Methods for correcting some of these errors are presented and illustrated.

Biologic Factors Considered

Usually there is little or no attention given to biologic considerations in this phase of prosthetic dentistry. The "set-ups" are usually done by laboratory technicians and are accepted by dentists with little or no change. Laboratory technicians work with inanimate unyielding materials and have little or no conception of the dentist's problem. Certainly satisfactory results cannot be attained sight unseen, despite good bite-blocks.

Difference in Fit Must be Considered—It should be noted that a bite-block or baseplate fits in a different manner in the mouth from the way it fits on the model. The stone model is unyielding but the mucoperiosteum overlying the ridges in the mouth permits the baseplate (or the denture base) to seat or settle *into* the soft yielding tissue cushion. The yielding of the soft tissue cushion is greater under continued pressure and accounts for the "settling" of the dentures during the first few weeks of use.

Compensation Required—Too often, unless this phenomenon is originally compensated for, the dentures will soon settle enough to be out of proper occlusion, and the intermaxillary bite relationship will not be the same as when the dentures were first inserted. It is frustrating to see this bite closure develop soon after the dentures are completed when much time and effort were spent in achieving a satisfactory centric relationship.

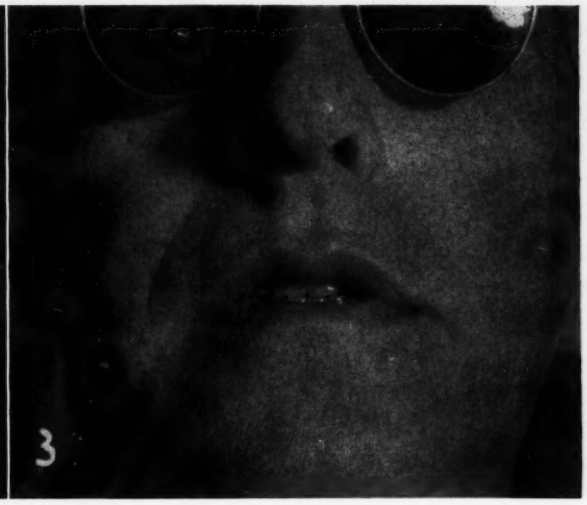
Method Used for Compensation

To compensate for the anticipated settling of the dentures (1) achieve a good centric relationship, and (2) raise the lower occlusal bite-rim in the posterior region to the degree that the bite will be closed by spot grinding, milling, and settling. While this procedure starts the case with a slightly open bite relationship, it ultimately ends with the proper occlusion in the originally determined correct centric relationship.

Lower Anterior Teeth Set Lower—To accommodate the anticipated bite closure the lower anterior teeth are originally set lower (in an open bite relationship) so that their esthetic value will not be marred by grinding or milling (Fig. 1). Thus the bite closure is accomplished by spot grinding and milling of the posterior teeth only. The greater amount of occlusal

1. ***Showing open bite on day of insertion. Spot grinding and milling will be required on the posterior teeth only, thus preserving esthetics of the anteriors.***

2. ***Showing exaggerated overjet established to compensate for the anterior component of the mandibular movement in bite closure.***



3. ***Showing degree of bite closure brought about by spot grinding, settling and milling; three weeks after insertion. Compare with Figure 1.***

adjustment is done after the dentures are in use for two or three weeks.

Spot Grinding and Milling—1. At the initial insertion only spot grinding is done for the establishment of an equalized bilateral pressure. This is essential for uniform seating.

2. At the end of the first week additional spot grinding is done together with peripheral correction of overextension.

3. At the end of the second week, when considerable "settling" has taken place, milling may be undertaken.

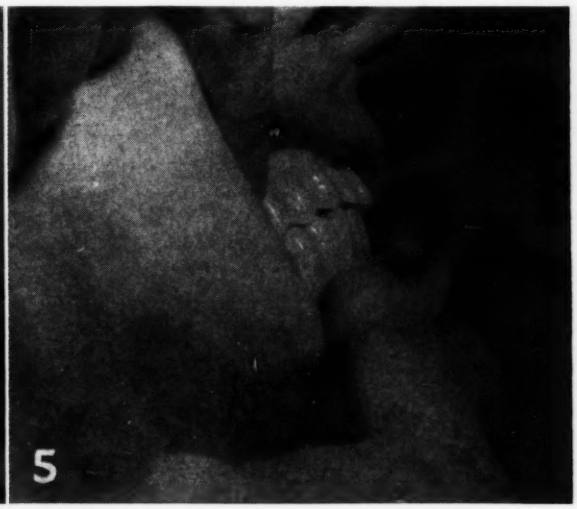
4. At the end of the third week persistent sore spots on the mucoperiosteum may indicate excessive pressure points rather than overextension. Occlusal high spots should be adequately relieved and the occlusion generally balanced with a final milling.

Bite Closure Obtained Gradually—It is gratifying to see the lower anterior teeth (originally set out of occlusion) gradually move up into proper position as the spot grinding, settling, and milling bring about a bite closure (Figs. 3 and 4).

To Estimate Degree of Compensation Necessary—The extent of compensating bite opening at the starting point of denture set-up is variable, depending on the thickness and resiliency of the mucoperiosteum and the patient's musculature.

Characteristics of Mouth Studied—It is difficult to establish in precise mechanical terms the degree of bio-

4. ***Showing reduction of overjet accomplished by the upward and forward arc described by the mandible in its path to centric occlusion, resulting from spot grinding and milling; three weeks after insertion. Compare with Figure 2.***



5. ***Relatively distal position of lower anterior teeth accommodated by grinding the mesial surfaces of the lower first bicuspids. Good overjet is thus obtained without crowding the posterior teeth distally.***

logic reaction to pressure by variable soft tissue. It is possible, however, to achieve, with experience, a fair degree of accuracy in determining the probable amount of bite closure that will occur with denture use in any particular case by a study of the mouth and its particular characteristics.

Lower Anterior Teeth in Distal Relationship

Another factor in the articulation of denture teeth that should be considered is the anterior component of the upward movement of the mandible in its path to bite closure. However slight the forward movement may be —and this factor too is a variable one —it must be anticipated by arranging the lower anterior teeth not only lower, as mentioned previously, but somewhat distally so that in effect the set-up will appear to have the upper anterior teeth in an extreme overjet position (Fig. 2).

Extreme Overjet Reduced—This seemingly extreme overjet, with progressive bite closure, will be reduced to a normal overjet because the anterior component inherent in the arc formed by the upward movement of the mandible will bring the lower anterior teeth forward as well as upward. Compare Figure 1 with Figure 3, and Figure 2 with Figure 4.

Crowding of Posterior Teeth Avoided—To accomplish an accommodation of the six lower anterior teeth in the distal relationship described without crowding the posterior teeth too far distally out of cuspal interdigitation, the author usually grinds the mesial surfaces of the lower first bicuspids (Fig. 5).

Cusp-to-cusp Relationship Avoided —In the cuspal interdigitation with the uppers, the lower posterior teeth are set as far distally as possible without actually creating a cusp-to-cusp relationship. This relatively distal relationship of the lower cusps to the upper sulci is created to anticipate the anterior component of the mandibular movement in closure.

Additional Considerations in Procedure

It is considered advisable to finish the upper denture first and to recheck and readjust the lower denture try-in to a completed upper denture. This procedure permits correction of variations resulting from processing and also provides a more stable upper unit than is possible to achieve with a waxed-up baseplate.

Mouth the Final Articulator—Too much reliance upon the mechanical articulator and its stone models leads to failure and frustration. The mouth itself must be used as the ultimate articulator in constructing successful artificial dentures, because a mechanical articulator cannot duplicate some of the biologic factors that must be accommodated in denture construction.

Biologic Response Must be Anticipated—No doubt every dentist has seen denture wearers whose teeth have settled out of sight with bite closure shortly after insertion of their dentures; and cases with originally good overjet soon develop an edge-to-edge relationship in the incisor region. Many of these cases were esthetically and mechanically correct when completed, but unfortunately biologic response was not anticipated and compensated for.

Length of Service Important Factor—As dentures are intended to serve for a number of years and not for just a day, they should not be built to achieve an ideal on the day of insertion but always for their utility and good esthetics after several months of use.

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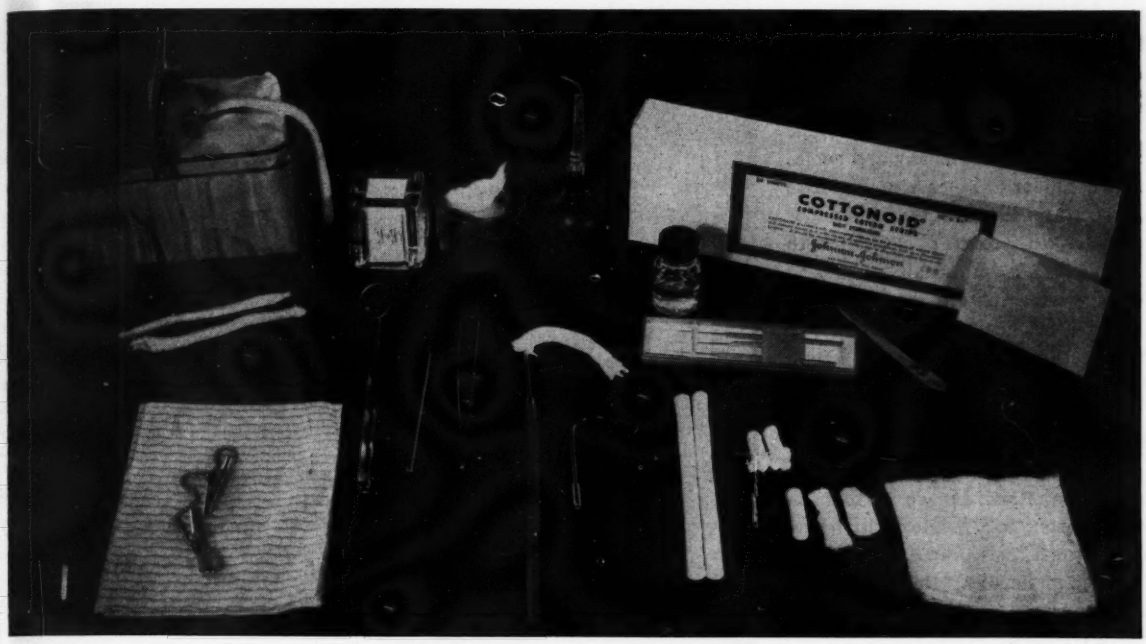
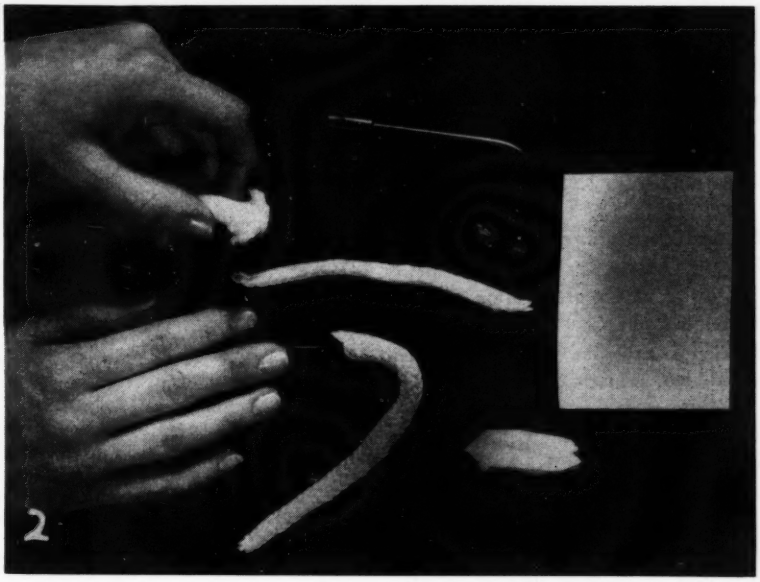


1. *The assistant should prepare the materials in advance so that they are ready for use.*

A Method of DRYING *the* MOUTH *Without the Use of a Rubber Dam*

EINAR J. OLSEN, D.D.S.,
Cleveland, Ohio



2. *Method is shown of placing Orasorb on saliva ejector.*

DIGEST

Accustomed to the use of plastics and silicates in operative dentistry, the patient will be grateful if the dentist can avoid the use of a rubber dam, thus preventing trauma to the periodontal membrane and the disagreeable aspects involved in the ligation of the dam in the mouth and the excess of material. The technique described herein for a method of drying the mouth without the use of a rubber dam is not recommended for use in the posterior part of the oral cavity, nor for the insertion of a gold foil restoration. For total success with the technique there are no short cuts. An able assistant is required and directions must be followed implicity.

Materials Required

In Figure 1 are shown the instruments and materials used in this technique:

1. Orasorb (on the left) is made by the Surgident Company and comes in a cardboard-like carton, but it is shown wrapped in white tissue paper to add an extra touch of cleanliness to the office. A glass container can also be purchased in which to store the Orasorb. The material comes in a long piece and can be cut into any length desired.

2. A waste receiver, cotton container, and chip blower are needed.

3. At the right are shown the container of Cottonoid made by Johnson and Johnson; S. S. White cavity lining and varnish; scissors; L. D. Caulk's varnish applicators; No. 2, Johnson and Johnson 6-inch cotton rolls; and saliva ejectors.

4. The cotton rolls are shown as they are cut. A piece of Johnson and Johnson Nu Fold Napkin may also be useful.

5. The manner in which the cotton rolls and Cottonoid are placed is shown in Figure 3.

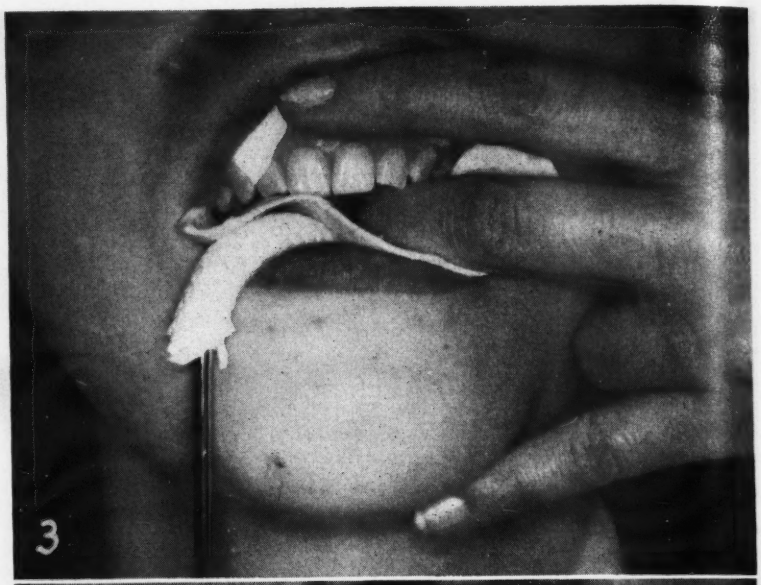
Technique Used for Upper Jaw

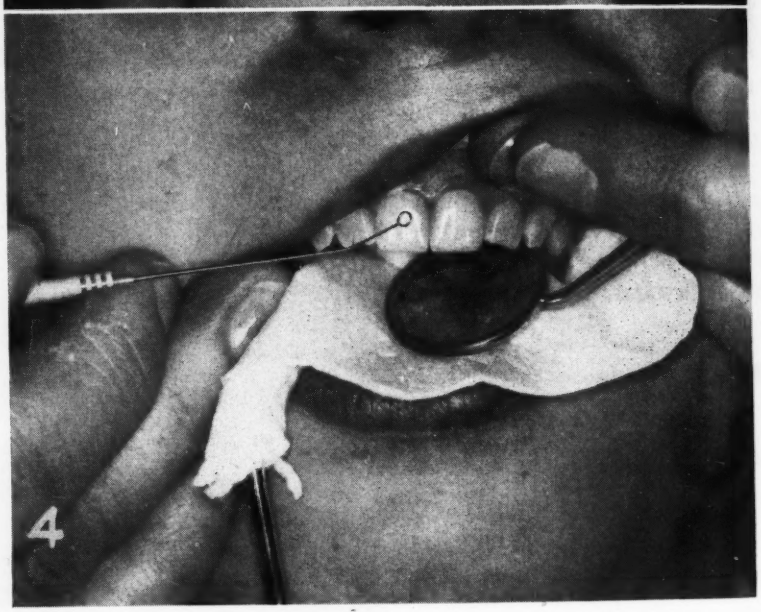
1. After cavity preparation on the mesial of an upper right central incisor, for example, has been completed, cut a piece of Orasorb long enough to extend from Stenson's duct on the right to Stenson's duct on the left (Fig. 3). Tuck this piece of Orasorb under the labial and buccal portions of the upper part of the mouth. Proceed with utmost care because the absorbing qualities of these materials take effect immediately.

2. Place the saliva ejector, covered with its Orasorb tubing, in a convenient position in the mouth.

3. Take an ordinary No. 2 cotton roll (Johnson and Johnson), cut it on the bias about 1½ inches to 2 inches long. Then cut this piece of cotton roll lengthwise.

4. Carefully remove the hard core of the cotton roll and place the half roll flat against the mucosa above the right central, making sure that it comes into contact with the Orasorb that is already in the mouth. The assistant should hold these materials firmly in place.



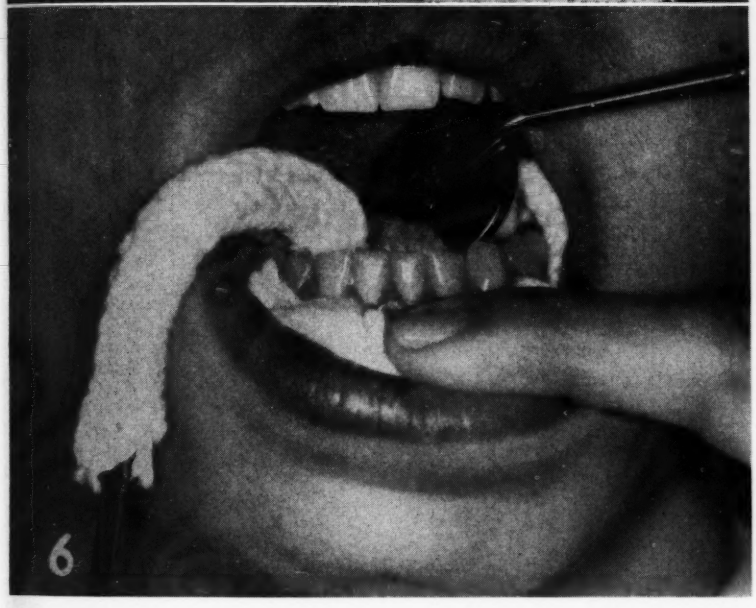


3. ***Proper position of assistant's fingers while holding materials in the patient's mouth.***

4. ***Applying the cavity lining and varnish.***

5. Cut a piece of Cottonoid crosswise about 2½ inches to 3 inches wide. Note that one side of the Cottonoid is corrugated and the opposite side is smooth. Place the corrugated side on the tongue and surrounding tissues, keeping the smooth side up as illustrated in Figure 4. This facilitates the easy removal of the Cottonoid when the operation has been completed.

6. After the insertion of the Cottonoid and Orasorb, take a small cotton puff (Fig. 2) and dry all the mucous membranes and tooth structure in the vicinity of the cavity to be restored, allowing sufficient working area. Use either an ordinary chip blower or an air syringe on the unit and dry the membranes thoroughly.



5. ***Nu-fold napkin may be used when saliva is copious.***
6. ***The position is shown of materials in the mouth for drying the lower jaw.***

7. After drying, dip a Caulk wire loop applicator (Fig. 4) into a bottle of S. S. White cavity lining and varnish, and paint all the tissue around the cavity, first on the labial and then on the lingual, being especially careful to paint into the interdental papillae of the gingival area surrounding the teeth.

8. If some of the varnish should accidentally get on the margins of the cavity, take a sharp chisel and trim the varnish off all the margins of the cavity. The field should now be ready for the insertion of the restoration.

9. With a patient who has an excessive amount of saliva, place the Nufold Napkins beneath the Cottonoid (Fig. 5) thus making it possible to insert the restoration in a dry field.

Technique Used for Lower Jaw

1. Cut three or four pieces of Orasorb of sufficient length to be inserted into the labial and buccal sulcus of the lower jaw. It will be found that in almost all instances approximately 5 inches will be the right length of the Orasorb pieces. Two pieces are generally used in the labial fold. On the lingual two pieces about 4½ inches long are generally used under the tongue (Fig. 6). The piece of Orasorb on the saliva ejector for the lower is about 2 inches longer than that used for the upper.

2. At once place a piece of No. 2 cotton roll about 2 inches long to the lingual of the tooth with the prepared cavity in it. Before placing this piece of roll in its proper place give it a twist so that it wll not be so stiff. Added pliability improves its absorbing qualities and thus helps to keep it in place.

3. On the labial use the same type of cotton roll cut lengthwise as that used in the upper jaw, checking carefully to see that the flat surface of the roll comes into contact with the mucosa and that the Orasorb has been placed in its proper position.

4. Use the cotton roll puffs for drying purposes, proceed with the chip blower, syringe, and varnish as used in the procedure for the upper jaw. Bear in mind that the assistant must hold these materials firmly in the mouth. Figure 3 shows the proper position of the fingers in the upper jaw, and Figure 6 shows their position in the lower jaw.

5. When removing the Cottonoid, Orasorb, and the cotton rolls from the mouth, be sure to moisten the materials with a warm mouthwash. This will prevent irritating the soft tissues of the mouth. Make no attempt to remove the varnish from the gingival tissue. It peels off in about an hour.

With the use of this method the mouth remains dry for approximately twenty minutes.

Conclusion

Because the periodontal membrane is slow to regenerate from trauma and usually does not regenerate at all, various ways were experimented with to find a method to avoid excessive trauma when applying the rubber dam. It is obvious why the technique described here is preferred to one involving ligating dental floss around the necks of the teeth and the necessarily traumatic use of instruments in the gingival trough.

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Full Coverage as an Approach to ORAL REHABILITATION – *Part One*

VICTOR N. JAFFE, D.D.S., Washington, D.C.

DIGEST

There is a tendency on the part of many practitioners to regard operators who undertake oral reconstruction (multiple jacket crowns, fixed splinting, precision appliances, cosmetic restorations in general, and crown and bridge construction) as specialists, favored with a particularly wealthy or discriminating clientele, or "lucky." The former is a possibility, the latter could not be farther from the truth. Actually, in daily volume practice it is probable that most elaborate reconstruction techniques are completely disregarded. There is almost a subconscious lack of recognition of the need for such procedure because of the possible responsibility involved and the time required for its completion. Shoulder type preparations made on an average of one a month are time consuming. Should such a preparation be repeated, however, twice or more a day, it ceases to be a chore, [1,2,3] ***becomes routine, and its prospect does not appear formidable.***

In this discussion emphasis is placed on full coverage shoulder preparations because the profession as a whole has accepted such technique as synonymous with oral rehabilitation.[4] ***The pinledge and modified three-quarter crown still occupy an important place in restorative dentistry and it is not intended to neglect these techniques.***

The material from which this article is drawn does not consist of one or two isolated clinical cases, but includes several hundred successful results obtained during the past four years.

Technique of Emergency Restorations

This technique originated from the immediate necessity to enable a patient to appear publicly during the reconstruction of an anterior maxillary bridge. An anterior fixed bridge restored a central and lateral incisor and was attached by two three-quarter crowns to the adjacent central incisor and the cuspid. Caries had occurred around these abutments and the bridge had loosened. The carious areas were such that the bridge could not be successfully recemented.

Procedural Steps—1. The bridge was temporarily secured with sticky wax and the labial anatomy was restored.

2. Tin foil was adapted over the labial and lingual surfaces of the teeth and an impression was taken in a small crown and bridge tray with plaster.

3. When the impression was removed the tin foil adhered to the plaster and the bridge came out with the impression. The bridge was removed from the impression.

4. The abutment teeth were prepared for full coverage with shoulder jacket types of preparation.

5. The nearest basic shade of self-curing acrylic resin was mixed and a bulk of it placed into the tin-foiled plaster impression.

6. This was quickly reinserted into the mouth and allowed to cure.

7. The all-acrylic resin one-shade bridge was removed with a Morrell Crown remover and the excess flash was disced off.

8. After polishing, the bridge was reinserted and secured by using a smear of zinc oxide and eugenol. This "tin foil and plaster" technique is still used as applied to the restoration of broken facings.

Simplified Technique — Often a simpler technique is used as described by Talkov[5], using one of the alginates as the impression medium rather than the plaster:

1. The impression is blown as dry as possible with air and the monomer is dropped into it by a pipet followed by the acrylic resin powder.

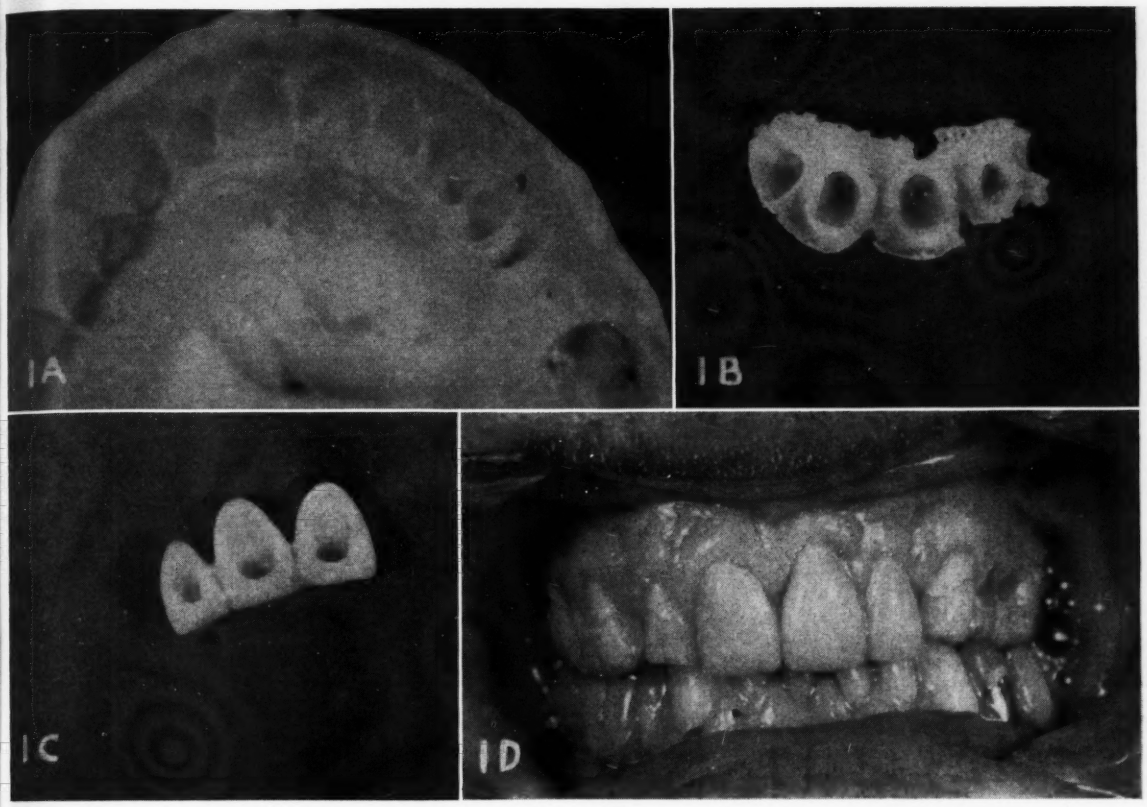
2. Just before the resin becomes tacky the impression is reinserted into the mouth and the resin is allowed to cure as before.

This method has become routine procedure in our office for single jackets as well as for multiple splinted restorations and one of the laboratory acrylic resin powders is used with a self-curing monomer (Fig. 1).

Disadvantages — Obviously there are some difficulties:

1. A burning sensation may be ex-

[1]Ewing, Joseph E.: Beautiful, but Glum. The Porcelain Jacket Crown, J. Pros. Dent. 4:94-103 (Jan.) 1954.
[2]Brecker, S. Charles: The Porcelain Jacket Crown. St. Louis, C. V. Mosby Company, 1951.
[3]Walton, Charles B.: Methodical Jacket Crown Preparation, JADA 47:1-5 (July) 1953.
[4]Miller, I. Franklin: Personal Communication.
[5]Talkov, Leo: Temporary Acrylic Fixed Bridgework and Splints, J. Pros. Dent. 693-702 (Sept.) 1952.



1A. *Alginate impression dryed and ready to receive acrylic resin polymer and quick cure monomer.*
1B. *Cold-cured splint removed ready for trimming.*
1C. *Splint after removal of flash and light polishing.*
1D. *Immediate splint in place to be worn until final reconstruction.*

perienced by the patient from the monomer and sometimes an actual chemical burn of the mucosa is evident. This does no permanent damage and heals rapidly.

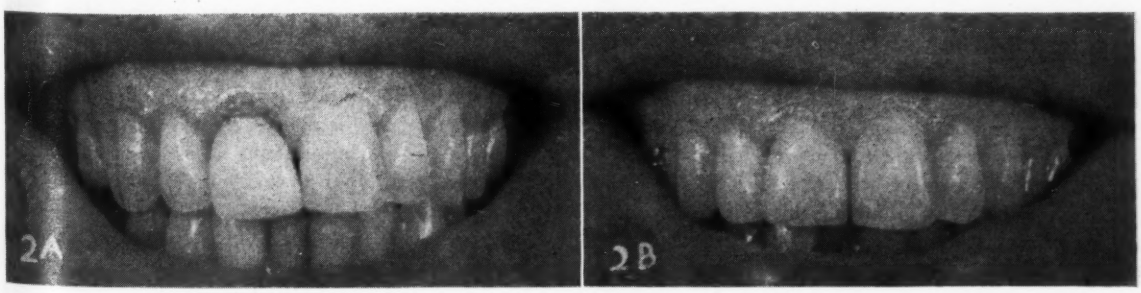
2. If one is not careful to eliminate undercuts in the preparation, the acrylic binds and cannot be removed without fracturing either the tooth or the acrylic. The restoration usually is removed quite easily but in extreme cases the acrylic may be split axially along the abutment and later repaired with monomer and polymer by the brush-on method.

Necessary Recognition of Full Coverage

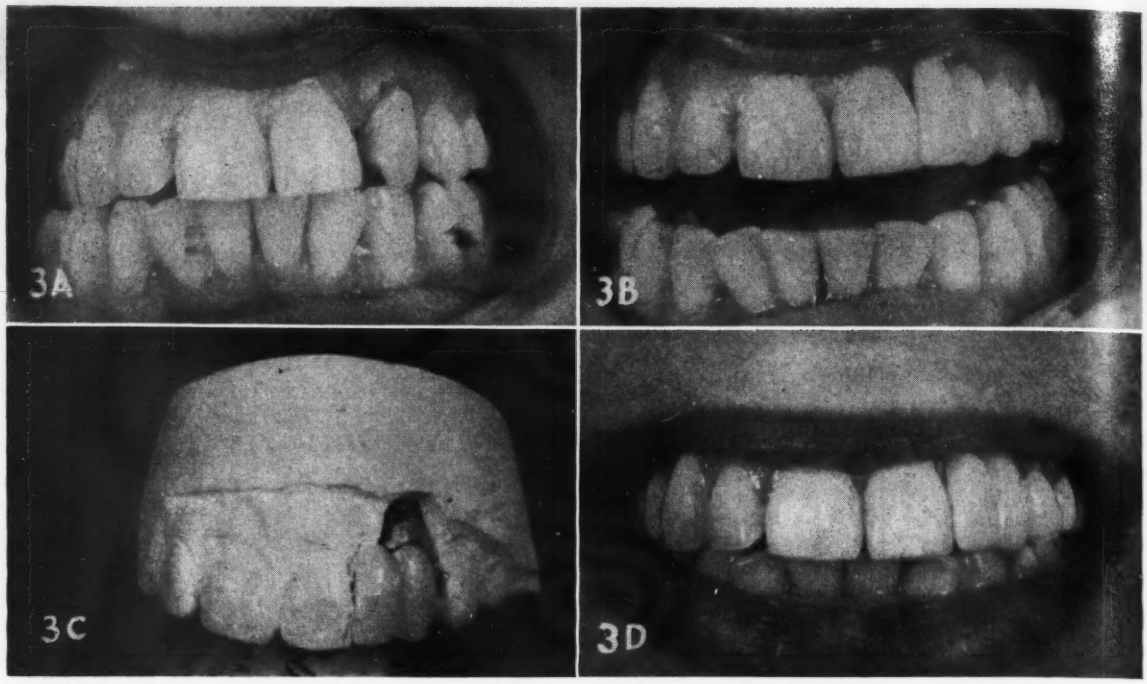
If the approach to restoration were made with full coverage in mind and opportunities were noted for cosmetic improvement as well as for essential restorative procedures, the technique of shoulder preparation would show improvement from repetition.

Consideration of Extensive Rehabilitation — Furthermore, diagnostic thought would be directed more in terms of extensive rehabilitation, since such rehabilitations are merely multiples of a single reconstruction.

Development of Technical Skill— These opportunities are a combina-



2A. *Gingival recession at neck of jacket after some years of use.*
2B. *New jacket esthetically correcting defect.*



3A. *Congenitally absent lateral.*
3B. *Stock plastic tooth ground to fit slightly overlapping central at incisal for testing esthetic quality.*
3C. *All porcelain two-in-one jacket crown.*
3D. *Completed restoration.*

tion of essential restorative procedure as well as cosmetic considerations. They also will develop the operator's technique in the execution of the shoulder preparation as well as the ability to think in terms of extensive reconstruction.

Examples of Full Coverage Often Overlooked

(1) There may be an existing upper anterior porcelain jacket of which the cervical margin is exposed through years of gingival recession (Fig. 2). Too often this condition is not called to the patient's attention. The economic factor need not be excessive because the preparation is basically done. The following steps are taken:

1. An alginate impression is taken of the upper arch and when removed is laid aside in a bowl of water.

2. The old jacket is slit labially by the use of a separating disc and split off with a chisel.

3. Using a spray of cold water (routine in all preparations) to control the temperature, a new gingival shoulder is cut with a Number 558-559 tungsten carbide bur used axially in a straight handpiece until it is just under the free margin of the gingiva.

4. The alginate impression is centrifugally freed of water by twirling the impression around, using a piece of dental floss tied to the handle. Acrylic resin polymer of the desired shade is dropped into the negative of the tooth to be jacketed, employing an eye dropper. Self-activating monomer is added and just as the mix appears to become tacky the impression is reinserted into the mouth and allowed to set.

5. On removal of the impression, the temporary immediate acrylic jacket will be adapted up under the gingiva with a cosmetic result.

6. The crown is removed and the flash trimmed.

7. The jacket is cemented with temporary cement and another appointment is made. At this sitting, the preparation may be further refined, a tube impression taken and eventually, through the use of a copper die and metal transfer coping and plaster impression, a new porcelain jacket or veneer is constructed.

8. If any other full coverage crowns are indicated, the patient is now in a receptive frame of mind, mostly due to the impressiveness of the immediate temporary restoration.

(2) Porcelain jacket crowns could be employed more frequently on lower bicuspids. Those teeth where caries or restorations are at the gingival as well as mesial and distal can be improved by full coverage. The esthetic result is quite visible to the patient and an immediate replacement technique may be used.

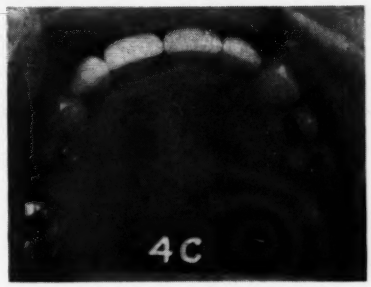
(3) Anterior conditions may be seen in which there are congenitally absent or impacted lateral incisors resulting in cosmetic disharmony of the upper arch (Fig. 3). The following procedure may be completed:

1. A stock plastic lateral tooth may be ground and fitted directly into the space between the cuspid and central, just slightly overlapping the central at the incisal.

2. This is luted to place with wax, or even painted to place using the

4A. *Centrals too wide for harmony, placed to eliminate midline diasthema.*

4B. *Cosmetic effect achieved in the same mouth utilizing a more even division of all four incisors.*



4C. *Slight diasthemic space permissible distal of laterals since visual focus is removed from the midline.*

brush-on method of self-activating resin. The cosmetic result is at once effected and the patient can see the desirability of further procedure.

3. An alginate impression is taken and the cuspid prepared conventionally using a shoulder preparation.

4. The alginate impression is reinserted with the plastic inside and the resultant crown (literally two in one) will continue to meet with approval.

5. After the impression is removed it should be poured in stone and sent on to the laboratory to aid in the anatomy of the porcelain or veneered restoration.

6. In the case of a bilateral condition, the procedure is repeated on the other cuspid.

(4) A maxillary midline diasthema is not necessarily unesthetic; however, the appearance of many mouths can be improved by its elimination. If porcelain jacket crowns were constructed on the centrals closing the space, the result would be centrals that are too wide for harmony. When such a corrective procedure is suggested to the patient the procedure should always involve the laterals as well as the centrals, dividing the space up more gracefully (Fig. 4). It is even permissible to leave a slight diasthemic space distal of one or both laterals as the visual focus is now removed from the median line. Immediate temporary plastic jackets are first constructed as previously described.

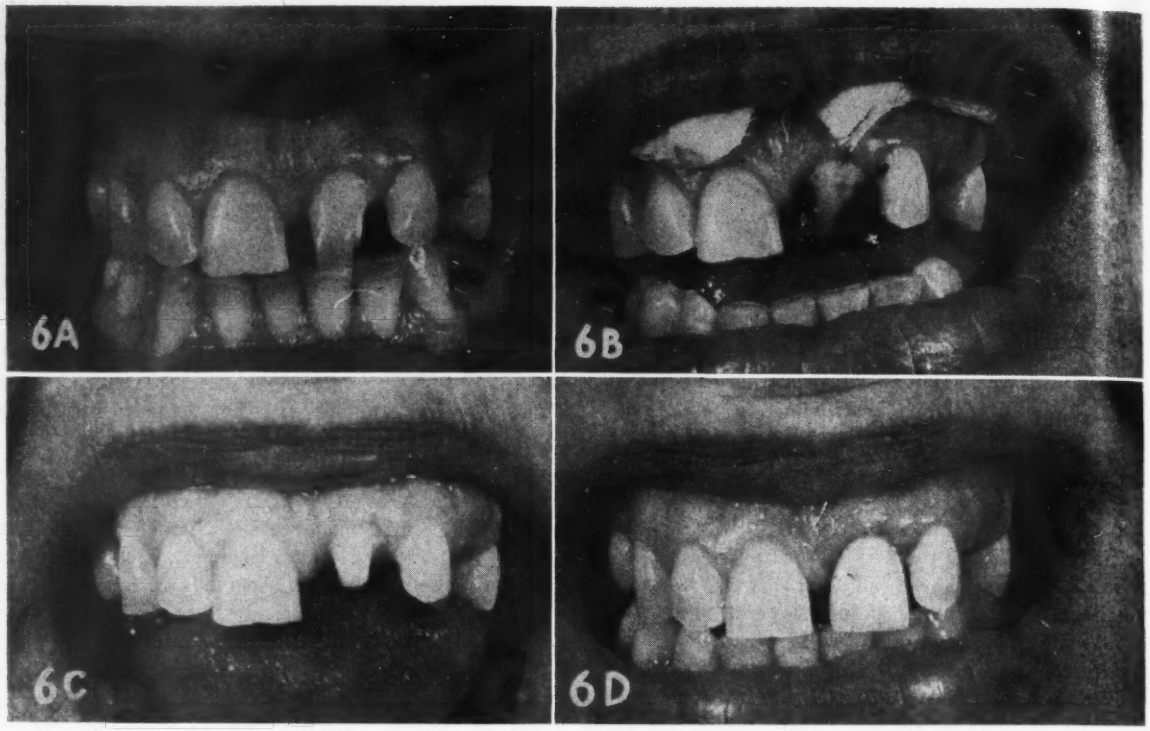
(5) "Pegged" lateral incisors in an otherwise satisfactory mouth demand cosmetic jacket rehabilitation. Needless to repeat, a shoulder preparation should always be made where possible.

(6) Often in adult dentitions where orthodontic correction is impractical and there is an overjet with proximal spacing, the four incisors can be jacketed and the overjet reduced. Here consideration of the bone factor may indicate splinting these teeth using unit type bridge construction or veneer soldered together to hold the position. The incisors could also be extracted and the reduction incorporated in a fixed restoration (Fig. 5). The four incisors that protrude can be brought back materially by beveling the incisal edges of the opposing occlusion.

(7) There are occasions where an anterior tooth such as a central has mesial and distal caries involving the

5A. *Reduced interalveolar distance and extreme vertical overlap.*

5B. *Finished fixed reduction accomplished by extraction of upper incisors and beveling of lower incisoral edges.*



6A. *A broken down central.*
6B. *Restoration of anatomy is made in wax before taking an alginate impression.*
6C. *The jacket crown preparation.*
6D. *Immediate acrylic crown, self-cured directly in the mouth, made in previous alginate impression.*

incisal corners to such a degree that their replacement successfully is doubtful. Also the degree of caries may extend to such a point that the pulp might be involved if restorative material is placed permanently upon that area without a cement base. The following steps may be taken:

1. Rather than recommend these teeth for removal, the tooth is again built up with wax and an alginate impression is taken (Fig. 6).

2. The tooth is prepared as for a jacket preparation and restored with an acrylic jacket directly cured. This is removed for finishing and then cemented to place.

3. This jacket, though not of the caliber of a heat-cured one, or of a porcelain reconstruction is an adequate economical esthetic restoration that can remain in functional usage for some years after it is cemented in position.

The work involved is less time consuming and requires less skill than do mesial and distal silicate or plastic corners and no one will take issue with the fact that this procedure is better than adding it to a partial restoration and certainly less involved than fixed bridge construction.

(End First Installment)

1314 18th, Street, N. W.

The Problem of Pain

HOWARD P. ROME, M.D.

If it is agreed that pain is purely a subjective phenomenon, it is useless to debate whether treatment should be physical or psychologic. Obviously, the physician treats the patient and not his disease or his symptoms alone. This treatment requires some understanding of him, his physical state as well as his attitudes and psychologic values. Nothing less than the whole person participates in the experience of pain.

From *Staff Meetings of the Mayo Clinic* **31**:226 (April 4) 1956.

Anatomic Considerations in MANDIBULAR DENTURE *Extension*

ARTHUR J. KROL, D.D.S., Chicago

DIGEST

There are two important objectives in the proper extension of the lower dentures (A) maximum retention, and (B) maximum support. Frequently by attaining one, the achievement of the other is advanced. As the various anatomic landmarks are discussed, their role in retention and/or support are described in detail.

Pear-shaped Pad Area (A)

Since this area is more frequently referred to as the retromolar pad area, the question of terminology arises. Anatomically speaking the term "retromolar pad" is applied to a soft smooth elevation of the mucosa which is found behind the retromolar (gingival) papilla and consists of loose connective tissue with an aggregation of mucous glands.

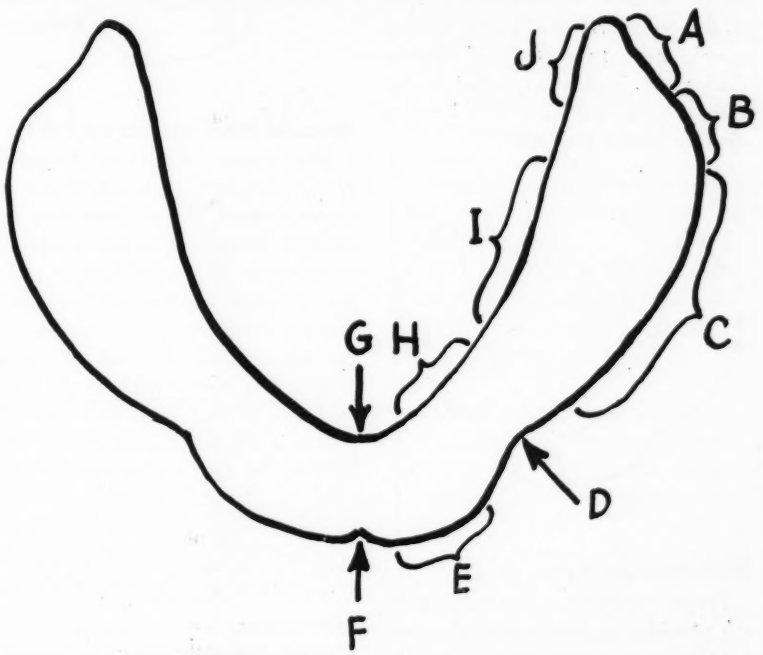
Appearance of Pear-shaped Structure—In a patient who has lost the third or second and third molars, the soft retromolar pad remains visible and in its normal position. Immediately anterior to it and blending with it, a pear-shaped structure often appears. It consists of fibrous tissue of the same kind as that forming the gingival mucosa and marks the distal termination of the edentulous alveolar ridge.

Proper Coverage Important — As pointed out by Craddock[1] this is the structure that should be covered in its entirety by the mandibular denture. Proper coverage of this pad is important for both retention and support.

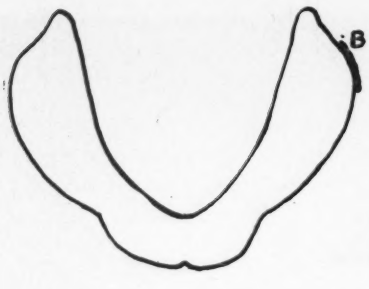
[1]Craddock, F. W.: Retromolar Region of the Mandible, JADA **47**:453 (Oct.) 1953.

Retention Established — Retention, primarily against the superior displacement of the distal ends of the denture when the patient incises upon the anterior teeth, is acquired because of the peripheral seal established by the slight compression of the pad generally obtained in most denture techniques.

Integrity of Bone Maintained—Support is also acquired because the integrity of the bone underlying the pad is maintained, probably due to the stimulation arising from the contraction of the deep fibres of the temporal muscles that insert in this region.



1. ***(A) Pear-shaped pad area; (B) masseter area; (C) buccinator area; (D) buccal frenum area; (E) mandibular labial area; (F) labial frenum area; (G) lingual frenum area; (H) sublingual gland area; (I) mylohyoid area; (J) retromylohyoid area.***

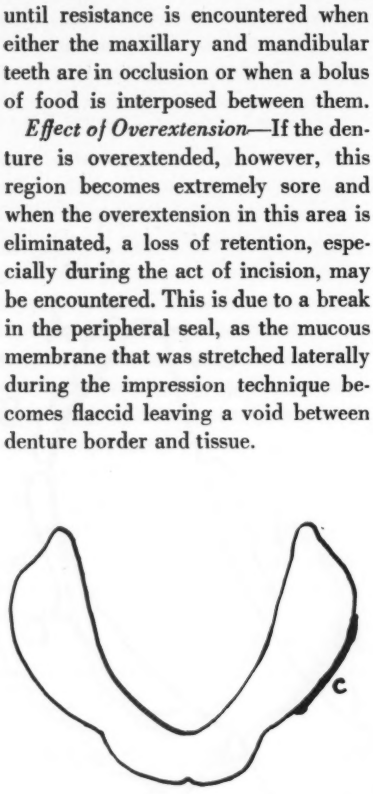


Masseter Area (B)

In this region, the denture is limited primarily in a lateral direction by the action of the masseteric muscle; that is, when the patient occludes forcibly, the masseter exerts a medial force against this border.

Cause of Forcible Action — The masseter cannot displace the denture, inasmuch as it does not act forcibly until resistance is encountered when either the maxillary and mandibular teeth are in occlusion or when a bolus of food is interposed between them.

Effect of Overextension—If the denture is overextended, however, this region becomes extremely sore and when the overextension in this area is eliminated, a loss of retention, especially during the act of incision, may be encountered. This is due to a break in the peripheral seal, as the mucous membrane that was stretched laterally during the impression technique becomes flaccid leaving a void between denture border and tissue.

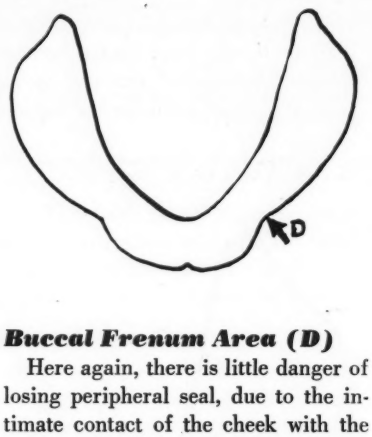


Buccinator Area (C)

Proper extension in this region usually provides the best supporting area for the lower denture. Maximum extension should always be sought here and is quite easily achieved; the buccinator muscle fibers along this area of attachment run in an oblique direction to the modiolus and, therefore, have little displacing action on the denture, tolerating what would be considered overextension with regard to the other muscles.

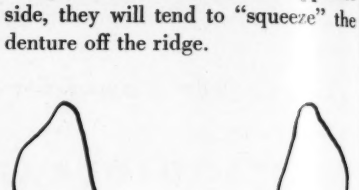
Reference to Buccal Shelf — This area is referred to as the buccal shelf because of its broad surface. Proper coverage by the denture distributes the load of mastication more widely. Also the contraction of the buccinator muscle provides some stimulation to the underlying bone making it more resistant to resorption.

Ingress of Air Prevented—Peripheral seal is relatively unimportant in this region because the cheek maintains close contact with the buccal surface of the denture preventing any ingress of air. Note the flare of the buccinator flange of the denture in the diagram.



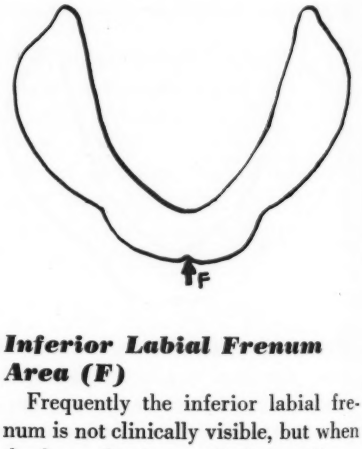
Buccal Frenum Area (D)

Here again, there is little danger of losing peripheral seal, due to the intimate contact of the cheek with the denture. Routinely the denture should be notched sufficiently deep to allow for complete freedom of the buccal frenum. Furthermore, in the area of the buccal notch, the denture should be kept as thin as possible to allow for the action of the triangularis muscle.* If this is not accomplished or if the teeth in this area are set too far buccally, the triangularis muscle will have an adverse effect on denture retention as shown by Fish[2], for when the origin, insertion, and function of the triangularis is considered, it can be readily seen that as this muscle contracts along with its mate on the opposite side, they will tend to "squeeze" the denture off the ridge.



Mandibular Labial Area (E)

In this region, there is one muscle of prime importance; namely, the mentalis. It is located laterally to the inferior labial frenum and will not tolerate overextension. Where retention is poor to begin with, the mentalis will readily elevate the lower denture unless this border is accurately established by muscle trimming.



Inferior Labial Frenum Area (F)

Frequently the inferior labial frenum is not clinically visible, but when the lower lip is stretched, it will appear. When this occurs, the denture should be notched sufficiently to accommodate the frenum.

Lingual Flange Area

Before considering the individual areas, a general remark can be made that applies to the entire lingual flange:

Since the peripheral seal is readily broken as the floor of the mouth elevates and drops, vigorous movements of the tongue in muscle trimming

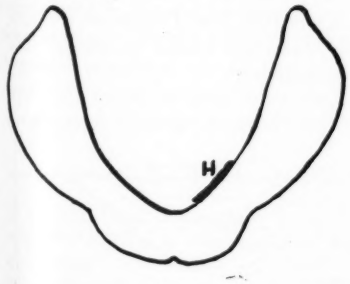
Nomina Anatomica, Baltimore, Williams and Wilkins Co., 1956, lists the term "musculus depressor anguli oris" with the following statement: "It was generally felt that, where possible, the functional aspect of the facial muscles should be indicated in their names."

[2]Fish, E. W.: Principles of Full Denture Prosthesis, ed. 5, New York Staples Press, 1952.

should be avoided to allow for maximum extension. This extension aids in maintaining the lingual seal and likewise provides a shelf against which the tongue can rest to retain the denture on its ridge. In view of the fact that extreme tongue movements are not ordinarily performed during the normal eating, swallowing, and speaking process, these movements should be avoided in establishing the lingual border and advantage should be taken of the longer flange provided by the more limited or normal movements.

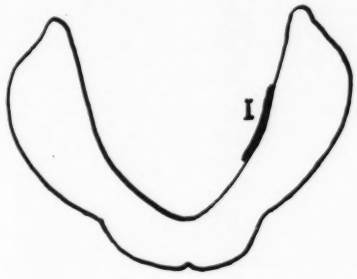
Lingual Frenum Area (G)

The notching of the denture in this area to permit free movement of the lingual frenum should be done judiciously. Excessive reduction of this denture border can result in an almost total loss of denture retention. Since the genioglossus muscle influences the length of the flange in this area, possible displacement of the denture can occur when overextension exists. Fortunately, during normal functional movements of the tongue the genioglossus does not contract to its fullest extent as it does in extreme protrusion of the tongue, hence permitting somewhat greater extension of the denture than might be apparent upon cursory examination.



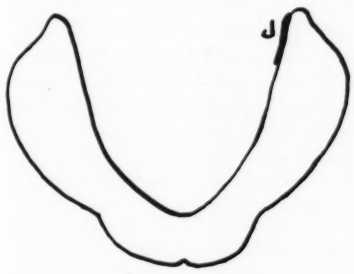
Sublingual Gland Area (H)

Frequently in this region, the denture border can be extended somewhat medially under the tongue to form an inclined plane upon which the tongue can rest, thus retaining the denture upon the mandibular ridge. Again maximum vertical extension is desired.



Mylohyoid Area (I)

The mylohyoid ridge should not be the determining factor in limiting the lingual flange in this area. The mylohyoid muscle descends almost vertically and seldom is elevated to a degree that would tend to displace the denture. In most instances, the lingual flange extends below the mylohyoid ridge and is determined initially by the elevation of the floor of the mouth as the patient wets the lips with the tip of the tongue. Later this extension can be modified to accommodate the action of the mylohyoid muscle in deglutition.



Retromylohyoid Area (J)

This is perhaps the most complex region to deal with in establishing the lingual flange. Yet maximum extension vertically and posteriorly is desired to permit the posterior portion of the tongue to rest against this flange and aid in its retention.

Limitations — The borders of this flange are limited posteriorly by the action of the palatoglossus muscle and inferiorly by the action of the lingual slip of the superior constrictor muscle. Upon swallowing, these muscles as well as the mylohyoid are readily activated, and when infringed upon, a sore throat results.

Preimpression Examination Important — Careful examination of the depth of this area prior to obtaining an impression is essential. In establishing the length of the denture border in this region a technique similar to that used to acquire the mylohyoid flange may be employed.

Conclusions

1) The various anatomic areas pertinent to successful mandibular denture construction have been presented.

2) As a corollary, careful examination and study of the anatomic landmarks is imperative in attaining maximum retention and support.

4255 *West 63rd Street*

Should the Superior Labial Frenum Be Excised and, If So, When?

Major Comment

A truly enlarged frenum must be excised; some will atrophy.

Watch as the permanent incisors erupt. The frenum may persist until eruption of the permanent cuspid.

Watch for tongue and lip habits. They, not the frenum, may be causing spacings.

If frenectomy is resorted to, it may be best to use an appliance immediately so as not to be impeded by scar tissue.

Added Comment

1. (a) Watch for hereditary factors. If the teeth remain upright, chances are such factors are present.

(b) Always advise surgical removal, not clipping.

Adapted from Editorial, A Panel Discussion of Orthodontics, *American Journal of Orthodontics* **40**: 386 (May) 1954.

The FREE-END SADDLE *Prosthesis*

Part One

ISAIH LEW, D.D.S., New York

DIGEST

One of the most difficult, and often one of the most discouraging problems confronting the prosthodontist is the unilateral free-end saddle restoration, particularly in cases where only the molars are missing and the rest of the arch is intact. This article describes an appliance evolved by the author which forms a single, functional, and economical unilateral restoration.

Types of Replacement Commonly Used

The traditional solution for this type of replacement is usually one of the following techniques:

(a) The lingual bar appliance, either cast or wrought clasps, utilizing the contiguous bicuspid for clasping, with the lingual bar extending to the opposite molar for additional stability.

(b) The lingual bar with the precision attachment of various types and shapes, with modification of abutments with the cast crown.

(c) The single cantilever, or splinted bicuspid cantilever, with the molar pontic attached to the joined crown.

Factors to be Noted—With the commonly used restorations several important observations can be made:

(1) Psychologically and economically patients resist the concept of the need for accommodating to such extensive prosthesis for a relatively small area of tooth replacement.

(2) Functionally, the slightest displacement on the molar saddle area, under function, causes movement of the entire appliance and/or the abutment teeth, effecting the following consequences:

Where the clasps on the abutments are secure or rigid, as in cast or precision attachments, the molar will show rapid bone destruction with accompanying vertical pocket formation and periodontoclasia. The bicuspid, similarly, shows deterioration of supporting tissue, usually in mesial-distal aspects.

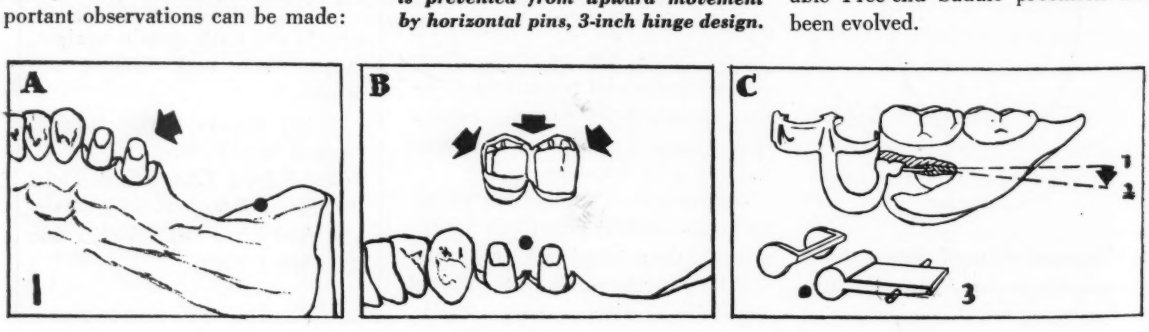
For these reasons, a careful scrutiny of patients exposed to such restorations will more often show the appliance reposing in the bureau drawer than functioning in the patient's mouth.

(3) The use of the cantilever is often satisfactory where only one molar is in position. Where the second opposing molar is still in the arch this tooth begins to elongate, a great deal of torque is created on the abutment teeth with accompanying periodontal symptoms, and often a distal drift of these abutment teeth becomes apparent.

Patient Objections — In all of the methods to restore a healthy complete arch that have been described, the patient is reluctant to use the appliance and the result is deterioration of the upper dentitions over the saddle area, that is, bone absorption, elongation of teeth, movement of contiguous bicuspids, and resulting malocclusion.

New Appliance Evolved

Because of the drawbacks observed in the conventional techniques, efforts were directed toward effecting the restoration of the unilateral free-end saddle with a prosthesis that would prove simple, economical, and comfortable; that would eliminate the cumbersome lingual bar and still retain rigidity, stability, and resistance to displacement under function. To this end, the Lew Unilateral Removable Free-end Saddle prosthesis has been evolved.



1. ***Schematic view of the Lew Unilateral Free-end Saddle restoration. (a) Model of prepared abutment teeth for veneer crowns. (b) One piece casting splinted veneer crowns with interproximal box and retention form, using equipoise principle in design. (c) Schematic cut-away view of completed removable portion of the restoration. The saddle is compressible from 1 to 2 but is prevented from upward movement by horizontal pins, 3-inch hinge design.***

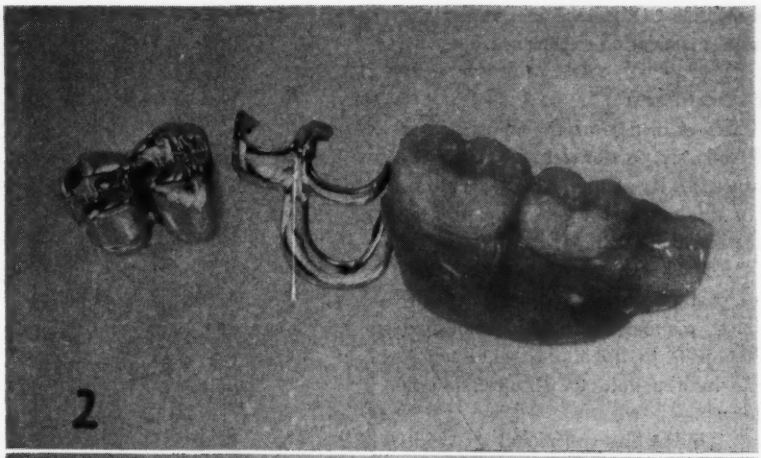
Description — The appliance consists essentially of three units, scientifically designed, to overcome most of the functional stresses and objections in the conventional prosthesis:

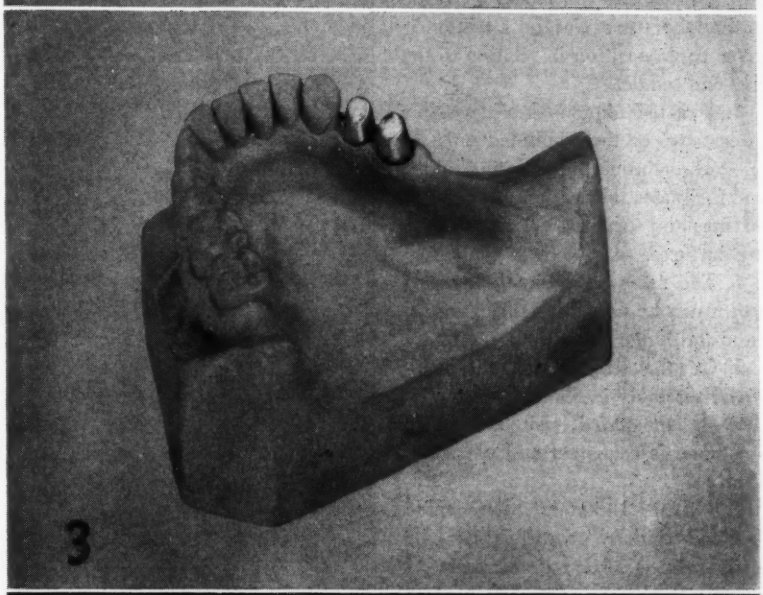
(a) The Abutment Crowns: These are usually two splinted contiguous teeth with cast gold veneer crowns surveyed for efficient clasping and retention (Fig. 1), with the interlocking box prepared at the junction of the two crowns. The entire retention portion (the mesial lingual of the first bicuspid and distal lingual of the second bicuspid), and the interproximal box are fabricated in the crown, keeping all clasps out of sight on the lingual surface. Occasionally, when the patient finds it difficult to manipulate removal of the appliance, a labial gingival arm is added.

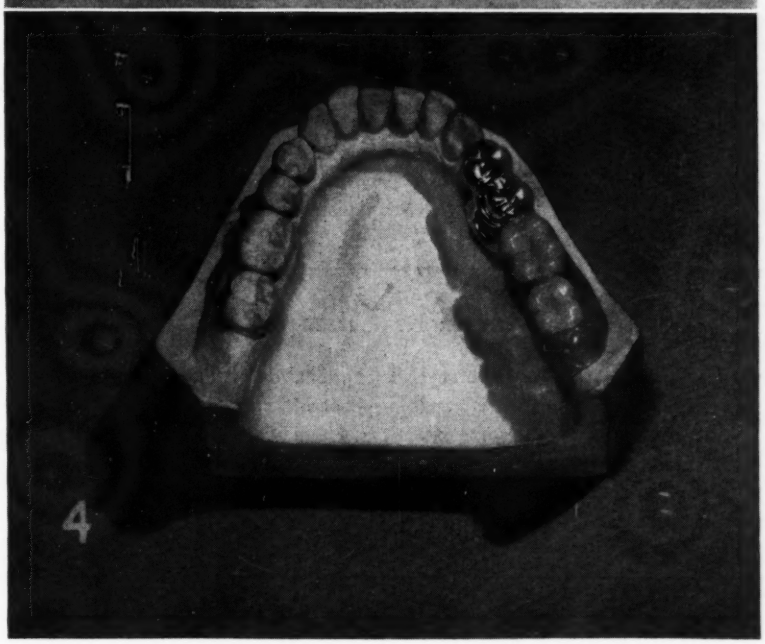
(b) The Saddle Area: This is built around the cast Vitallium® ridge with the hinge buried under the molar in the acrylic (Fig. 1C).

(c) The Cast Metal Frame: This consists of the surveyed lingual clasps, the Vitallium distal extension hinge, and the cast metal ridge. The clasps are fabricated directly in the crowns, assuring maximum precision of fit and retention. They are designed and cast in one unit, including the distal extension hinge and saddle. The hinge is only activated after the acrylic is processed (by heating the appliance to a moderate temperature) and carefully moved in the vertical aspect (Fig. 1C), until the degree of hinge movement commensurate with tissue compression and displacement under function is obtained.

Restoration in Function — A functional restoration has been achieved in which stresses of mastication are dissipated in the saddle area and tissue-bearing mucosa with minimal stress transmitted to the abutment teeth. At the same time adequate retention has been achieved as well as







2. ***Completed veneer crowns and removable section of the appliance, lingual view.***

3. ***Preparation of abutment teeth.***

4. ***Completed appliance. A model arch is restored. Anterior tongue space is free.***

resistance to displacement under the usual masticating experience.

Procedure

The efficiency of the appliance is directly proportional to the care exercised in its planning and execution. For this reason the following procedure is usually employed:

1. The abutment teeth are prepared for cast veneer crowns in the traditional manner, using the modified Thompson hydrocolloid technique. A bite hydrocolloid tray impression is taken.
2. Diolite dies and model are made in the laboratory. Careful attention is given to its position in relation to the free-end saddle.
3. This technique makes it possible to cast two or three splinted units in one piece, eliminating soldering joints, and facilitates fabrication of precision boxings and surveyed design of clasping surfaces.
4. The same model with the cast crown can be used for fabrication of the distal hinge assembly.
5. On the second visit the completed assembly is ready for a try-in.
6. On the third visit the entire prosthesis is cemented and placed in position.

The Lew Unilateral Removable Free-end Saddle prosthesis can be easily relined after several years of function to accommodate possible loss of vertical, without affecting the distal extension hinge function.

5. ***Labial view. Note healthy gingivae on the abutment teeth.***

6. ***Lingual aspect of the same patient. Actual photograph of the Lew appliance in the mouth for several years. Note: a labial arm is added to facilitate removal of the appliance by the patient but is not necessary for retention.***

Conclusion

The author reports a simplified technique used on approximately twenty-five patients over a period of five years. All of these patients had experienced unsatisfactory prosthetic replacements previously, or had resisted the concept of the lingual bar appliance.

200 *Central Park South*

Methods of Caries Control

AT THE moment, we have several methods, each of which is capable of controlling caries to some extent. Artificial fluoridation of water supplies deficient in fluorides is the most promising; and the topical application of fluorides to the teeth of children and possibly adolescents may also help. Less hopefully, we should encourage people to eat foods which have to be chewed and which help to keep the interdental spaces clean, rather than to fill them with sticky carbohydrate debris.

From Annotations, *Lancet* No. **6935**:182 (July 28) 1956.

The EDITOR'S Page

UNTIL THE cause of cancer is established, the early detection of the disease is the course that gives the most hope for successful treatment. Cancers that grow in internal organs have often spread and scattered to other tissues before a diagnosis is made. Treatment by surgery or irradiation for such lesions is palliative at best. Cancers of the mouth occur in positions that are readily seen and are thus amenable to early treatment.

Any lesion of the mouth that does not heal promptly, that presents a leukoplakic appearance, that shows evidence of lymph gland involvement should be suspect. The dentist should not attempt treatment of these conditions. It is a waste of life-saving time to temporize with such lesions. The dentist should refer the patient without delay to a qualified oral surgeon, not to a general medical practitioner.

In the course of a dental practice among adults every dentist may expect to encounter a few of these cases of grave malignant disease. If the dentist is alert to the implications of these conditions he can save lives and take his rightful place as an important member of the healing professions.

Morfit[1] has stated the problem of cancer of the mouth succintly:

"Patients with cancer of the mouth and neck generally have one of three broad presenting complaints. The commonest one, of course, is a sore in the mouth which fails to heal with routine medication. It usually is painless, and the patient may discover it by chance during his daily toilet, or the tip of his tongue may encounter a change in contour in one of the various recesses of his mouth or perhaps he may find that his dental plate no longer fits and he thus becomes aware of an ulcer on his gum.

"A second group of symptoms is associated with tumors arising further back in the throat. These patients complain of dysphagia, pain in the ear or referred to the ear and, if the tumor is anywhere in line with the airway, signs of respiratory obstruction.

"The third general presenting complaint is a lump in the neck. To the patient, this is the entire complaint. He does not associate it with any lesion inside his mouth. He may find the lump while shaving. Unless the physician is aware that the commonest explanation for a mass in the lateral part of the neck in adults is a metastasis and that there is a primary tumor, probably within the oral cavity responsible for it, these primary tumors might be missed. The patient has no warning that they exist, and the physician must look for them. To prevent being misled, he must know only this simple fact: A lump in the neck is probably a metastasis and the diagnosis remains incomplete until the primary tumor is found. . .

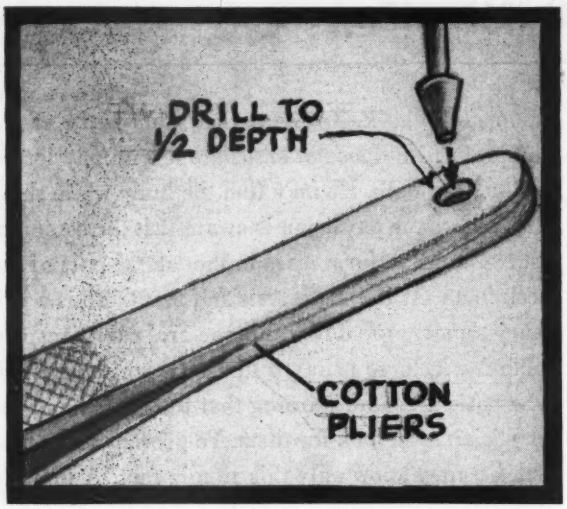
"The salvage rates for these various lesions, according to location, are as follows: Our five year cure rate for lip cancer, including all cases both in early and advanced stages, is about 70 per cent; tongue, 28; floor of the mouth, 25; mucosa of the cheek, 29; palate, 31; gums, 26; tonsils, 18.

"In reviewing our results, we divided the material into early and late cases, the dividing line being 2 centimeters in size, and found that if we can get patients early—that is, when the lesions are smaller than 2 centimeters—we can almost double the curability rate. That finding stands as a powerful argument for the early recognition and effective treatment of these lesions. Our results are not as good as we would like, of course. There still are failures, as is true in all varieties of cancer."

It is unwise for the dentist to lull a patient into false security by keeping lesions that may be malignant "under observation." It is as bad to subject these lesions to empiric treatment. It is even worse for the dentist to perform a biopsy or a surgical procedure in an area that may be the site of cancer.

There is substantial evidence that suggests that nondefinitive surgery may cause a seeding of malignant cells into the lymph stream and the implantation of cancer cells in other tissues. The dentist will serve best by making a prompt referral of *all* suspicious lesions to a qualified oral surgeon who is prepared to perform the kind of major surgery that may be necessary.

[1]Morfit, H. Mason: Cancer of the Mouth and Neck, Postgrad. Med. 20:283 (Sept.) 1956.



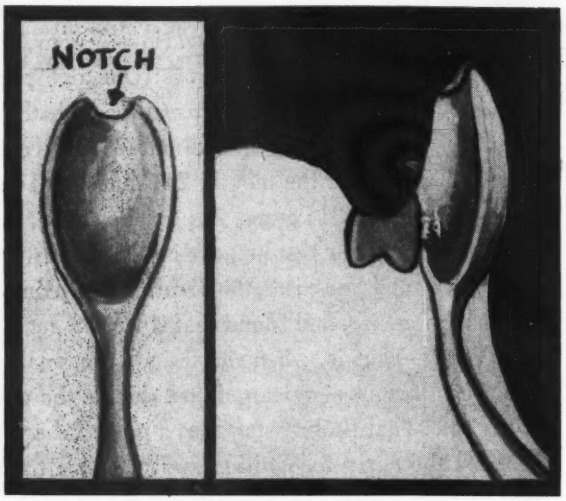
1

Clinical and Laborator

Wedge Inserter

J. Robert Mayden, D.D.S., Crown Point, Indiana

1. Use a dental bur to cut a round slot in the handle of a cotton plier. This makes a suitable instrument to use to force wood wedges between the teeth.

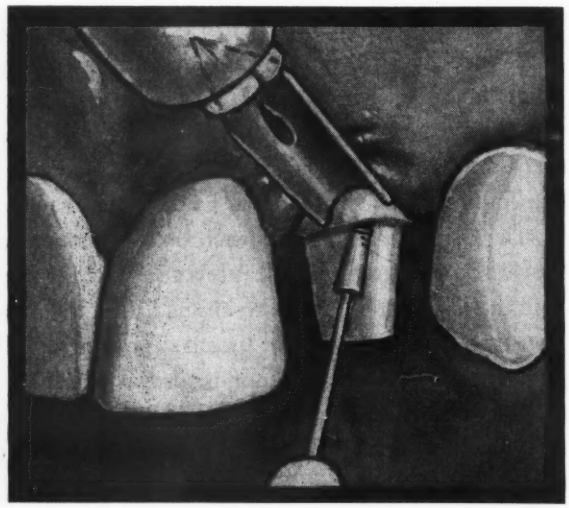


2

A Surgical Retractor

Philip Shiffman, D.D.S., Cedarhurst, L.I., New York

2. A notched stainless steel table spoon makes a suitable retractor for cheek and tongue tissues when placed in the pterygomaxillary notch during surgical procedures in the area of the maxillary tuberosity.



3

A Gingival Retractor

W. E. Chubb, Lt. (DC) USN, Key West, Florida

3. Slip a pen point under the eraser in an ordinary pencil. This makes an ideal retractor for the gingival tissue when making the shoulder for a jacket crown preparation.

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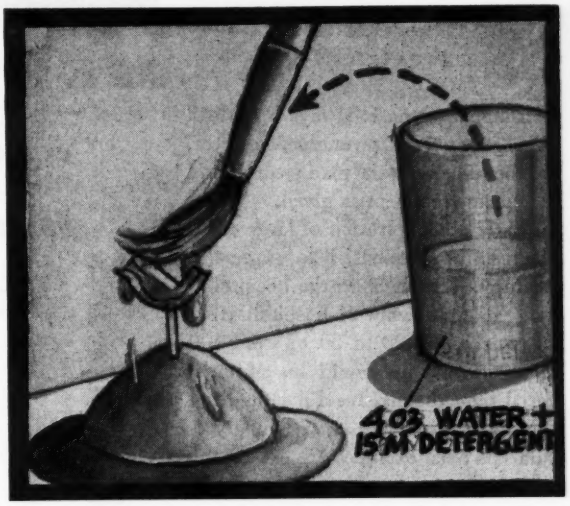
SUGGESTIONS . . .

An Investment Debubblizer

Robert Wooden, D.D.S., Jacksonville, North Carolina

4. A satisfactory wetting solution for painting wax patterns before investment is made by adding 15 drops of a liquid household detergent to 4 ounces of water. Surface tension is reduced and the investment will flow evenly over the wax patterns.

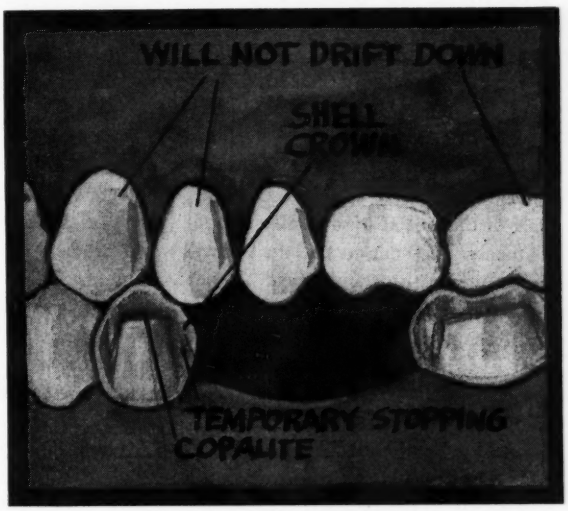


4

Positive Retention of Temporary Aluminum Shell Crowns

W. Bernard Mack, D.D.S., St. Louis, Missouri

5. Apply a heavy coat of cavity varnish (Copalite) to the crown preparation. While the varnish is still wet, fill the aluminum shell crown with heated temporary stopping and have the patient bite the crown to place. One of the zinc oxide bases may be used instead of the stopping.

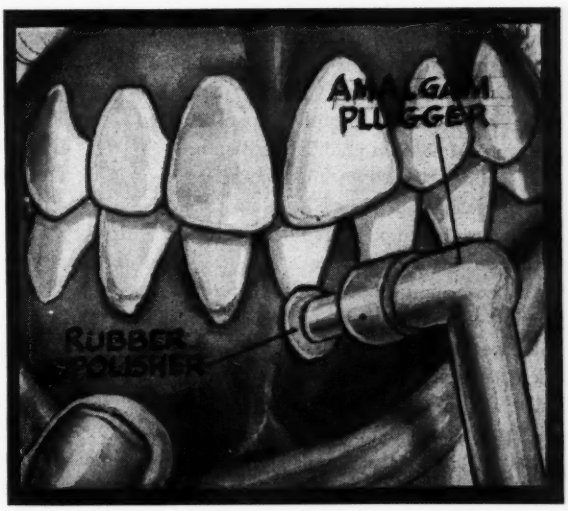


5

A Gingival Stimulator

Bernard Seff, D.D.S., New York

6. A rubber polisher in an automatic amalgam plugger makes a good vibrator to use to stimulate and massage the gingival tissue during periodontal treatment.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 36 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

MEDICINE and the Biologic Sciences

Diabetic Coma—Treatment

Diabetic coma is always a medical emergency. It is reversible, however, if the diagnosis is made early and adequate treatment is given.

Early administration of large doses of insulin is essential to successful therapy. Treatment in the hospital is advisable. If delay of hospitalization is anticipated, 20 to 50 or even 100 units of insulin should be administered immediately. Insulin should not be given, however, until hypoglycemia has been excluded by testing the blood or urine sugar.

The total insulin requirements in the first twenty-four hours is roughly proportional to the initial blood sugar. The insulin requirement may not be known until a second blood sugar determination measures the efficacy of the first dose. Insulin is given in divided doses and may be administered as often as every fifteen to thirty minutes. If acidosis is severe, half of the initial dose is given intravenously. If 50 per cent of the twenty-four-hour insulin requirement has not been given in three hours, administration is too slow.

Dehydration and electrolyte losses are important features of diabetic coma. They include dry, inelastic skin, dry tongue and mucous membranes, and soft eyeballs. Both intracellular and extracellular fluid are lost, along with sodium, potassium, and phosphate ions. Sodium losses lower the ratio of sodium to chloride, and relative hyperchloremia appears.

Normal saline is usually adequate for initial replacement therapy. The ideal solution is a slightly hypotonic mixture of sodium chloride and sodium lactate. Potassium and phosphate are preferably provided by diet. Parenteral potassium is avoided unless urine output is adequate.

Glucose should not be administered during the first hours of treatment. Glucose increases the insulin requirement, contributes to potassium deficiency, and invalidates the blood sugar as a prognostic sign. Hypertonic solutions are avoided.

Gastric lavage is performed to overcome acute gastric dilatation and to prevent vomiting and aspiration. Lavage and an enema relieve distention and prepare the alimentary tract for food and fluids.

Diagnosis of diabetic coma may be difficult. Weight loss, thirst, urinary frequency, and persistent glycosuria usually are noted. The finding of acetone or diacetic acid in the urine is an important warning. Headache, restlessness, nausea and vomiting, drowsiness, and air hunger should arouse suspicion.

Root, Howard F.: Treatment of Diabetic Coma, J. Chronic Dis. **2**:121-135 (*March*) 1955.

Psychosomatic Gastrointestinal Problems

Motility, vascularity, and secretion of the gastrointestinal tract may be increased by anxiety, unexpressed anger and resentment, and frustrated desires for affection. Hypoactivity of the functions is caused by states of depression, loneliness and isolation, and apathy. The disturbances in physiology are mediated through the autonomic nervous system.

In the upper tract, peptic ulcer may be produced by hypermotility, vascular engorgement, and increased secretion. In the lower tract an ulcerative colitis may be produced. Depression of motility and secretion and vascular pallor in the upper tract cause appetite disturbances. Underactivity in the lower tract results in constipation.

Children with primary chronic peptic ulceration are often less aggressive than healthy children and have difficulty expressing aggression and anger. When the need for a secure love relationship with the mother during infancy is not met, the search for affection and love may be carried into all areas of life. Reaction to emotional stress is with upper gastrointestinal hyperfunction because this organ is most important in the interpersonal activities of feeding during the first year of life. When hyperfunction continues, ulceration may occur.

Approximately 10 per cent of adults with ulcerative colitis are initially affected during childhood. Children with ulcerative colitis are depressed and struggle with anger and guilt toward hostile and rejecting mothers. The bloody diarrhea expresses the angry impulses that the child cannot deal with consciously. Stages in the disease can often be correlated with precipitating life situations. Psychotherapy may be beneficial.

Psychogenic vomiting may be an expression of hostility to parents who are forceful in the feeding situation, a reaction to actual or threatened loss of loved ones, a symbol of rejection of parental attitudes, a reaction of adolescent girls to fears and anxieties, and a nonspecific reaction to stress.

Constipation is an expression of resistance and negativism. Toilet training gives the child an opportunity to resist parental efforts. In adult life, resistance becomes unconscious. Many cases of infantile colic may be largely emotional in origin. The mother is often anxious, cold and emotionally rejecting.

Treatment should not be directed solely to the local gastrointestinal lesions, since function is disturbed on the autonomic nervous system and cerebrocortical levels also. A compre-

(*Continued on page* 34)

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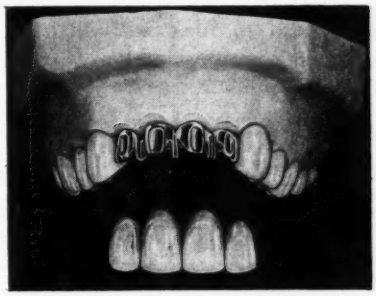

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Slightly Controversial

It is an attribute of the creative mind that it must transcend the old order; before any new concept is established, the hold upon us of what we know must be broken.

This originality may achieve no more manifestation than an extreme dissatisfaction with what already exists. And what already exists may only have as excuse for its existence the sanctity of age, the holiness of familiarity.

So it may be with dental products. To move beyond requires courage; it requires the understanding that the established is not absolute. The faithful conformist has no chance of creating anything.

Thus it was with P. F. some years ago. P. F. (a posterior filling) was a complete departure from the conventional. It matched the posterior teeth; it was adhesive enough to hold without undercuts; it was non-metallic. It was all that amalgam was not.

As in all things, new P.F. had some bugs not apparent in the testing laboratory. These were corrected. Some over-optimistic use was curtailed. Now P.F. seems to have established a place in every dental office.

But first let us digress. We have gone on record and we are repeating, the brush technic has caused more failures in plastic fillings than have the inherent defects of the acrylic filling materials. And P. F. is not an acrylic. P. F. is a mineral plastic formulated to hold to the cavity walls without shrinkage, formulated to withstand abrasion, formulated to be a posterior filling material.

Now, after five years of experience, we can unconditionally recommend P.F. for the following routine dental fillings. (1) All posterior one surface fillings such as class V types. (2) All class I types. (3) All posterior fillings where esthetics is of paramount importance, as in the mesial of the class II in the 1st premolar. P.F. should never wash out.

As before mentioned, do not use the brush technic if you expect to get the utmost out of P. F. fillings. All of the qualities that make P. F. what it is are a part of the powder. The brush technic uses far too much liquid and is absolutely inconstant. We have developed the "five—one" technic for P. F. and PEARLon to insure that the qualities built into these filling materials will be in the filling you place.

The "five-one" technic utilizes the smallest amount of monomer that can be used. This is important. It insures fillings that can actually be as permanent as a filling can be. This "five-one" technic is described in a previous issue.

We had a personal experience with our Kal-Drox which bears listening to. Yours truly had a tooth-ache. Examination disclosed an under the gum cavity mesial on the upper left 1st molar, with fairly good access. So my dentist gave me an injection, removed all the decay with a round bur, and ended with a cavern. No undercuts or cutting of sound dentine was done, as Kal-Drox is adhesive. The cavity was cleaned with alcohol and then dried slowly but thoroughly. A goodly layer of Kal-Drox was applied and then covered with P. F. When the injection wore off, I knew I had a sick tooth, very sensitive to change in temperature.

In two days the tooth became sensitive to pressure, became sore but did not throb. Eating shifted to the other side. At times I was thinking of extraction. But then I thought of the analogy of other live tissues of the body.

If a finger becomes infected, a certain amount of pain and discomfort is involved and we do not cut off the finger because of it. So I decided to stick it out. I knew that it took a certain amount of time for the odontoblasts to recover from shock, etc. In about nine days, recovery commenced. It continued steadily. One month later my tooth is apparently sound, and with only the normal response to heat and cold.

I wonder how many teeth in my time I have recommended extracting, rather than have the patient undergo a certain amount of discomfort. But in those days, nothing was known about calcium hydroxide. Kal Drox is the preferable method of applying calcium hydroxide to a "sick" tooth. As a matter of fact, it is our practice and our recommendation that Kal-Drox be applied to all cavities wherever depth allows.

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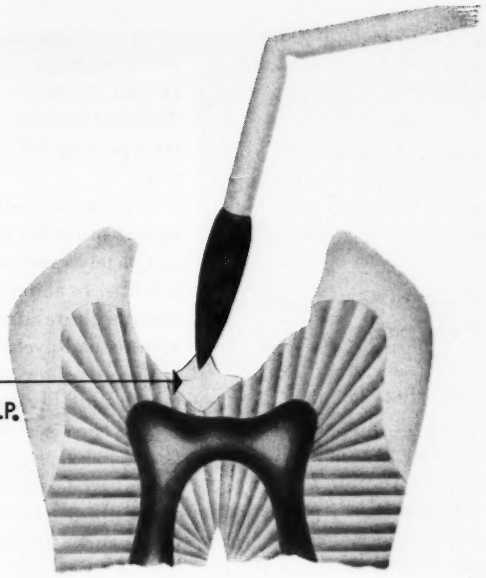

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hensive approach, including attention to psychic tension and to stressful interpersonal relations, brings the best results.

Chapman, A. H., and Loeb, Dorothy G.: Psychosomatic Gastrointestinal Problems in Children, Ann. J. Dis. Child. **89**:717-724 (*June*) 1955.

Poliomyelitis during Pregnancy

It appears that poliomyelitis is more frequent in pregnant females than in nonpregnant women. It is not, however, more severe or fatal. Pregnancy is an added risk, particularly in the third trimester. Protein, electrolyte, and fluid balance must be carefully observed. Respiratory obstruction, infection, and toxemia are constant problems.

The usual supplemental sodium chloride should be omitted in pregnant respirator patients after the fifth month of pregnancy because of the danger of hypertension.

Pregnancy is terminated only for obstetric reasons with the exception of the few patients with acute severe progressive bulbar spinal disease in whom the fetus is viable. Such patients need prompt tracheotomy, respiratory aid, and caesarean section.

When the vital capacity drops to one-third or one-fourth of normal, respiratory assistance is mandatory. Management of pregnancy for respirator patients is greatly facilitated by positive-pressure devices which permit opening of the respirator. Abdominal palpation, fetal heart auscultation and rectal and vaginal examinations are then easily performed.

Once a patient has become stabilized to respirator care, spontaneous labor and vaginal delivery are anticipated. The uterine muscle usually contracts efficiently. Narcotics or barbiturates are not given. Sufficient relief during labor is usually provided by 50 milligram doses of Demerol. Delivery on the respirator table is usually feasible.

Respirator care may become unnecessary shortly after delivery. Postpartum improvement is sometimes rapid. Respiratory assistance, however, is always needed when vital capacity remains 100 cubic centimeters or less for longer than three weeks. Termination of pregnancy in such instances does not improve vital capacity.

Pregnancy does not involve particular problems in women who have completely recovered from poliomyelitis. In ambulatory patients, however, with residual paralysis, pneumonitis and pyelocystitis may occur.

Records show that the over-all maternal mortality rate is about 5.2 per cent. There is a 5.8 mortality in the first trimester, a 3.1 per cent in the second trimester, and a 7.5 per cent in the third trimester. The total fetal loss is about 22 per cent. Abortion occurs in 13 per cent of the cases.

Infants of mothers who had poliomyelitis early in pregnancy are small at term. There appears to be no intrauterine transmission of the virus.

Horn, Paula: Poliomyelitis in Pregnancy, Obstet. Gynec. **6**:121-137 (*July*) 1955.

Myocardial Infarction in Women

The incidence of myocardial infarction is lower in women than in men. The condition is seldom noted before the fifth decade in women. Premenopausal infarction is seldom due to spontaneous coronary arteriosclerosis. The sex differences in myocardial infarction have been known for a number of years. The reasons for the differences, however, are not clear.

Several factors may contribute to a delayed onset of myocardial infarction in women. Even in infancy, the intima of the coronary arteries is thinner in females than in males. The premenopausal woman does less heavy work, has a smaller heart and requires less coronary circulation than the male of the same age.

Female sex hormones have widespread effects upon the vascular bed aside from the effect on cholesterol. During the premenstrual period, arterioles are dilated and capillary permeability is increased. With the onset of menstruation, sensitivity of the small vessels to epinephrine is increased. Estrogen promotes the retention of sodium and water and, through changes in calcium metabolism, may have an indirect influence upon atherosclerosis.

Loss of menstrual blood lowers the red cell mass, and in addition, fibrinogen is lost. Periodic fluctuations in the platelet count during the menstrual cycle alter coagulability of the blood.

Strong predisposing factors, such as hypertension, diabetes, or both, almost always exist when myocardial infarction occurs before the menopause. Other factors include polycythemia vera, coronary emboli due to valvular heart disease, and obesity.

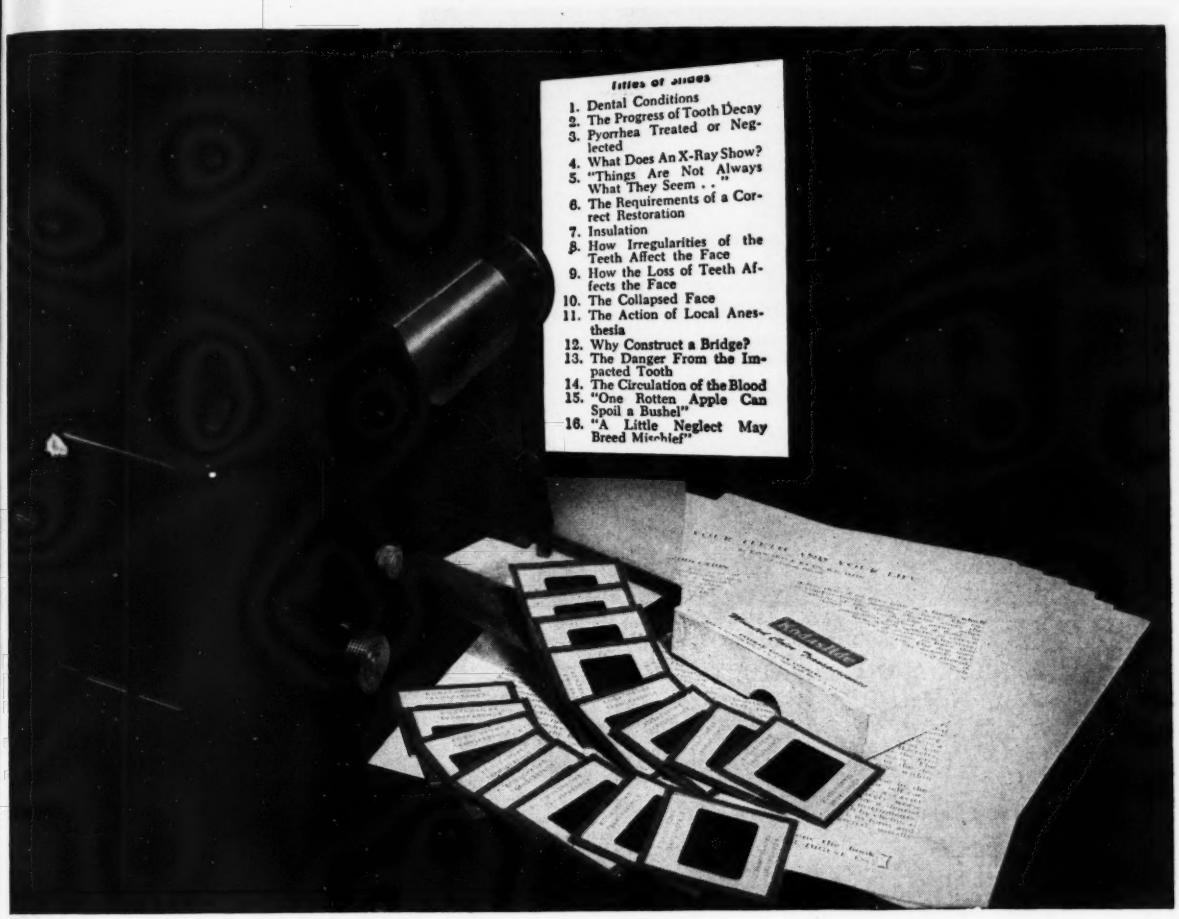
James, Thomas N.; Post, Henry W.; and Smith, F. Janney: Myocardial Infarction in Women, Ann. Internal Med. **43**:153-164 (*March*) 1955.

New Reactions of Fluoride

Summary and Conclusions

Evidence is presented that fluoride may interact with the keratin in enamel and alter its susceptibility to microbial attack. This is not surprising since it is known that some fluoride accumulates in those parts of the body where keratin is located. For example, chronic fluoride poisoning affects those structures that are of ectodermal origin and are regulated by the parathyroid; namely, the teeth, hair, nails, and the skin and its appendages, through which some fluoride is excreted. Fluoride is a neuro-toxin, and the central nervous system tissue contains neuro-organic components of enamel, which have heretofore been overlooked in research on the mode of action of fluoride, must now be considered if we are fully to understand the role of this element with respect to dental caries.

From *Journal of the New Jersey Dental Society*. **27**:4 (April) 1956.


Titles of Slides
1. Dental Conditions
2. The Progress of Tooth Decay
3. Pyorrhea Treated or Neglected
4. What Does An X-Ray Show?
5. "Things Are Not Always What They Seem . . "
6. The Requirements of a Correct Restoration
7. Insulation
8. How Irregularities of the Teeth Affect the Face
9. How the Loss of Teeth Affects the Face
10. The Collapsed Face
11. The Action of Local Anesthesia
12. Why Construct a Bridge?
13. The Danger From the Impacted Tooth
14. The Circulation of the Blood
15. "One Rotten Apple Can Spoil a Bushel"
16. "A Little Neglect May Breed Mischief"

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 28 *and* 29)

Form to be Used by Contributors

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From: _____

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Subject: _____

Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.

$10 will be paid on publication for each suggestion that is used.

Contra-Angles

Oxygen and Blindness: Fluoride and What?

Every week the American Medical Association sends out a news release on some of the important articles that are to appear in the *Journal* and other Association publications. These are stories intended primarily for newspapers and other media of public communication. The news releases are skillfully done, considering that some of the subjects are highly scientific.

One Sunday while reading the latest AMA release I came upon an article from the *Archives* of *Ophthalmology* that might have a deadly parallel in the dental field, a grim analogy.

Three authors with unimpeachable connections, working under grants from the United States Public Health Service and the National Society for the Prevention of Blindness were reported to have said:

"Premature infants should be given additional oxygen only in emergencies and then for as brief periods of time as possible, three Detroit researchers said today.

"They based their recommendation on a recent study which showed that length of exposure to oxygen is the important factor in producing retrolental fibroplasia, a serious eye disease which may result in blindness. This differs from earlier studies indicating that the concentration of oxygen was the causative factor.

"Retrolental fibroplasia was first recognized as a disease of premature infants in 1942 and is now the major cause of blindness among children. Oxygen administration to premature infants was implicated as a possible cause in 1952.

"However, because the disease appeared to occur haphazardly and be-

WILLIAMS *Plastics*

TIME SAVERS, WITH ECONOMY SAFETY AND ACCURACY

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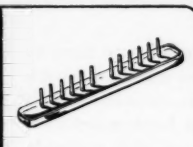

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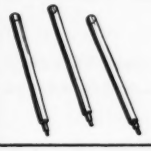
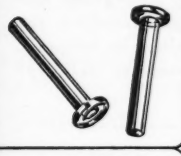


— for quicker, safer, single or multiple sprueing. Complete burnout eliminates need of removing sprue after investing. 10, 12, 14 and 16 gauge.

PLASTIC POSTS



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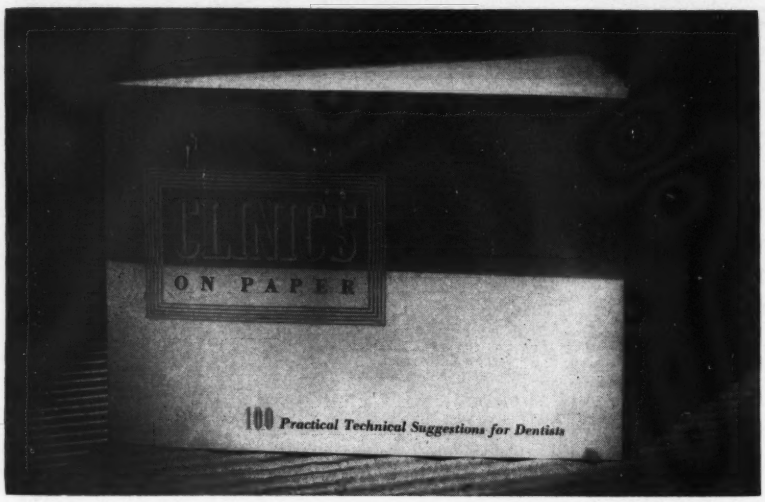

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cause no information was available on death rates due to curtailing oxygen for premature infants, doctors have been reluctant to change their routine of oxygen administration.

"The Detroit researchers now report that restricting oxygen not only lessens the chances of retrolental fibroplasia, but also appears to have no effect on an infant's chances for survival."

The grim analogy to which I referred concerns the possibility that fluoride might be toxic in some way to some specific tissue and in a way that is now not known.

In the case of this serious disease of the eye, that often leads to blindness, let us look at some facts:

1) Oxygen was administered under hospital conditions. Oxygen is necessary for all life processes. No one knew that oxygen was toxic to the eye of the premature infant.

2) The disease of the eye was "new" (first recognized in 1942) although oxygen has been given to premature infants for the past 40 years, at least.

3) There was a time lag of 10 years between the time the disease was first described (1942) and until oxygen was implicated (1952).

4) It was first thought, when the thought finally occurred to anyone (1952), that the *concentration* of oxygen did the damage. The recent report, four years later (1956), shows that it is the length of exposure to oxygen, rather than the concentration of the gas, that produces the serious eye disease.

5) Finally, and this sentence must stand out boldly: "*However, because the disease appeared to occur haphazardly and because no information was available on death rates due to curtailing oxygen for premature infants, doctors have been reluctant to change their routine of oxygen administration.*" Mind well: this statement was not made by a crank, a crack-pot, a health faddist, a chiropractor. It is an official statement by the American Medical Association—as candid and as direct a statement on medical attitudes and practice as one would care to read.

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(*Continued from page* 38)

Now let us dentists exercise the same kind of candor.

Because there are no figures available on morbidity and mortality rates that show a connection between fluoridation and disease can we be certain that no such relationship exists?

May there be diseases that appear haphazardly, to which we ascribe other causes, that may actually be related to the fluoride ion? This possibility requires soul-searching by both the dentist and the physician. Neither can pass off the responsibility to the other.

Have we been reluctant to change our assumption and the routine of our thinking merely because some professional organizations have adopted resolutions approving fluoridation? This epidemic of resolutions has spread from one organization to another without critical review. That does not represent the usual method of science.

Have we been guilty of the sweeping generalization? Have we protected ourselves by saying "*So far as our present knowledge extends* we know of no harmful relationship between fluoridation of communal water and serious systemic disease." Or have we stated categorically and with rigid dogmatic emphasis: "There is no relationship between fluoridation of communal water and serious systemic disease?" There is a world of difference between these two statements. One represents the skepticism of true science; the other the rigidity of a preconceived view.

If the life-giving and life-sustaining element (oxygen) can cause blindness, what possibility is there that the fluoride ion, that is not necessary for life processes and is toxic, may cause other forms of serious disease?

It took ten years after the eye disease was first recognized to implicate oxygen and it took another four years to demonstrate that it was not the *concentration* of the oxygen but the length of exposure to the gas that did the damage to the eyes.

When we express ourselves as cocksure that the *concentration* of fluoride in 1 part per million parts of water is perfectly safe what evidence do we have that the *length of exposure* to the fluoride ion is perfectly safe? The burden of proof of safety is upon us, the people who are supposed to be scientists. It is not upon the public to be required to show that fluoridation is harmful. What evidence do we have to prove that prolonged exposure to fluoride is safe, except the rough vital statistics from communities where fluoride appeared in the water supply under *natural* conditions?

I am aware that anyone who at present questions the desirability of fluoridation would not win first place in a popularity contest within the dental profession. I am also aware that anyone who questions "authority" is subject to some abuse and ridicule.

I was disturbed on the Sunday that I read the American Medical Association's news release because I had the morbid feeling that there *might* be a bitter analogy between oxygen for the premature baby and blindness and between fluoride and the degenerative, life-destroying diseases of the adult.

I certainly do not state that there is such a grim relationship between fluoride and systemic disease. I do not know of such a relationship and so far as I am aware no one else *knows*. Nor is anyone certain that there is *not* such a connection. There are many opinions on the subject. Most of them suggest that my perturbation on the subject is unjustified and that fluoridation is entirely safe. I hope that in the long projection of time my fears will be proved unfounded. *I want to be wrong!* Meanwhile, please do NOT place me in the camp of the antifluoridationists. I prefer to remain within the "judgment suspended" group.

—E. J. R.

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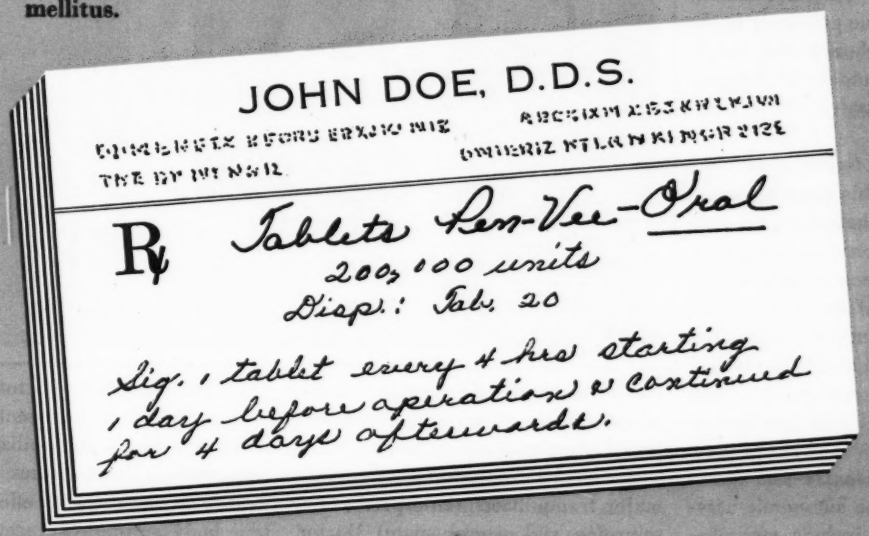
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What are the Tranquilizers?

Terminolgy

The term "tranquilizer" is being used to describe what are actually two basically different types of drugs, those that affect the autonomic nervous system and those that do not. The autonomic nervous system is that part which controls the involuntary, or "automatic" functions of the body, such as respiration and heartbeat.

Modification of Terms Suggested—The two groups might better be called "autonomic suppressants" and "central relaxants," was the suggestion of Frank M. Berger, M.D. at a conference on meprobamate (Miltown or Equanil) and other tranquilizers held by The New York Academy of Sciences. Doctor Berger directed the research that led to the development of meprobamate.

Difference in Effect — The two groups of tranquilizers differ from each other, not in the intensity of action, but in the kind of effect they exert, in their modes of action (as far as it is understood) and in their field of usefulness. The central relaxants appear to be of value primarily in the treatment of psychoneurotic conditions, while the autonomic suppressants are mostly useful in the treatment of psychoses.

Agents Included Among Autonomic Suppressants—In this category would be included the phenothiazine compounds, such as chlorpromazine, promazine and mephrazine; reserpine and related alkaloids of Rauwolfia; and diphenylmethane-derived compounds such as azocyclonol and hydroxyzine. All these drugs, it was pointed out, affect the autonomic nervous system to some degree.

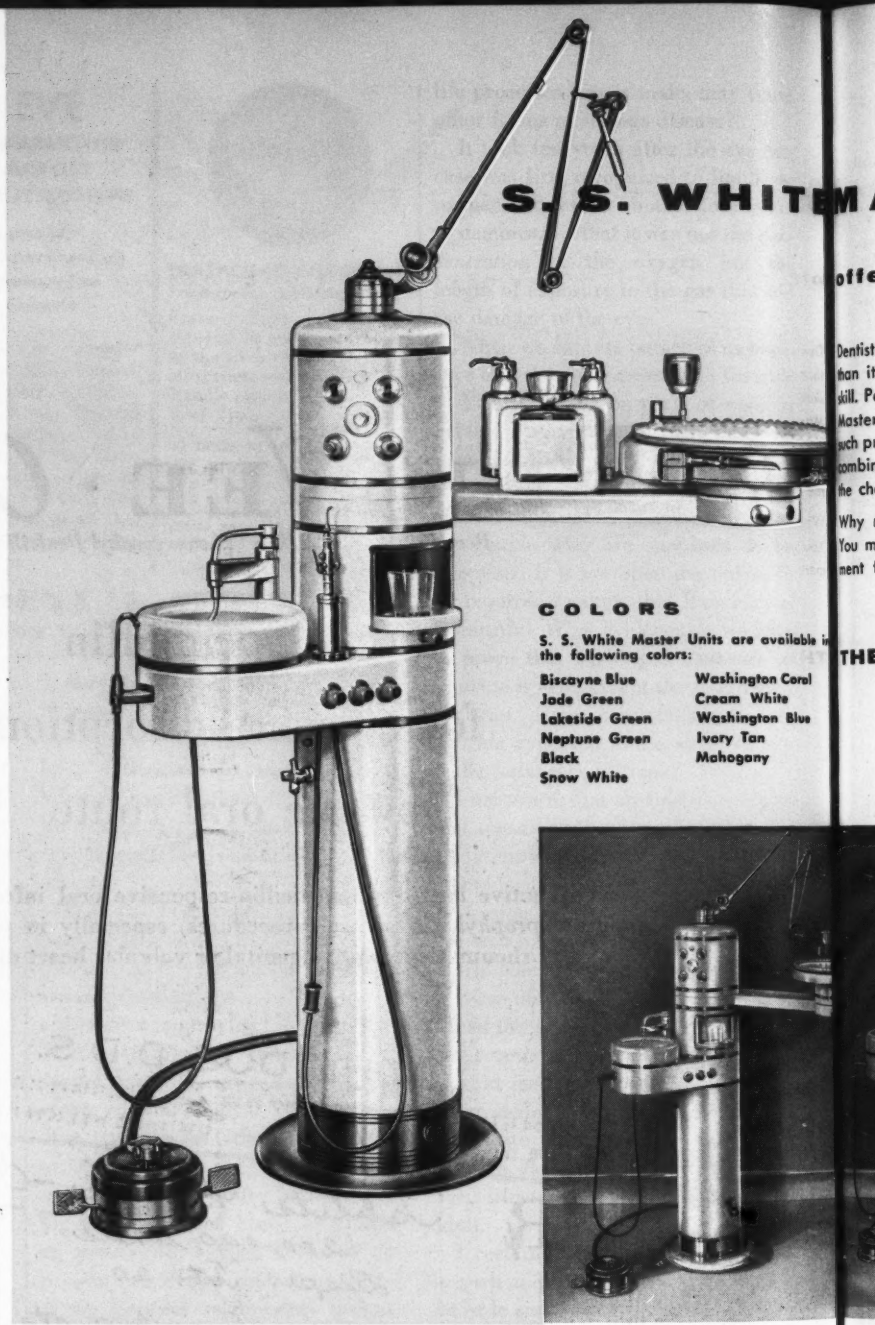
The Central Relaxants—The agents with no effect on the autonomic nervous system would include meprobamate and mephenesin, a muscle relaxant.

Other Classifications Possible—Up to the present time no pharmacologic test has been developed in which all drugs used as tranquilizers show a positive response. In the pretranquilizer era, these drugs would have been classified directly in accordance with some of their other pronounced and useful pharmacologic actions.

Autonomic Depressants—The three major tranquilizers (chlorpromazine, reserpine, and meprobamate) Doctor Berger stated, would have been known as a potent hypnotic, a true sedative, and a long-acting muscle relaxant and anticonvulsant, respectively.

Counteraction of Body Substances

Several pharmacologic tests were described which in Doctor Berger's opinion point up the essential differences between the tranquilizers. These tests show (1) that the autonomic depressants counteract the effects of certain body substances (acetylcholine, histamine, and serotonin) that regulate autonomic function. (2) They produce a sleep pattern in the electroencephalogram (the charted picture of the brain's electrical potential) without necessarily producing sleep. (3) They block certain conditioned reflexes, perhaps by interfering with



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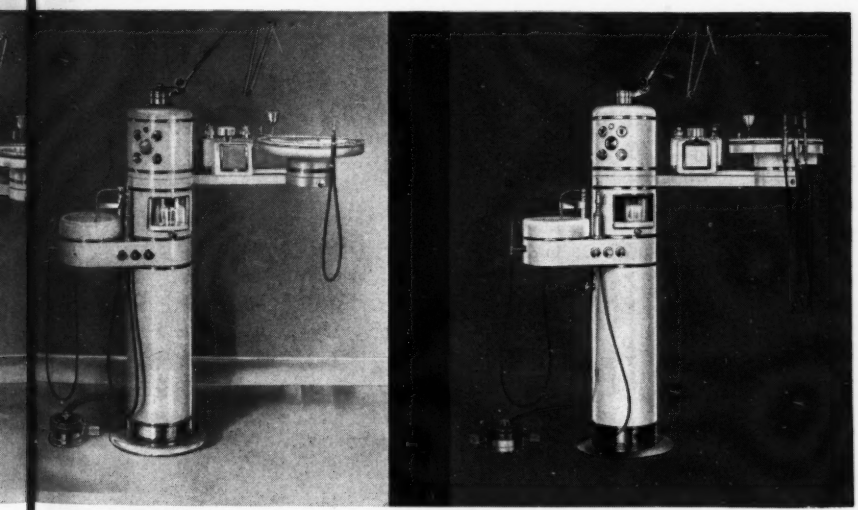

memory, learning, and performance. (4) They prolong barbiturate anesthesia, perhaps by interfering with the enzyme acting on the barbiturate. (5) They increase the hyperexcitability experimentally produced by strychnine and lower the electro-convulsive threshold-point at which electric current will produce a convulsion. (6) In monkeys they reduce aggressiveness, but at the same time produce withdrawal, listlessness, anorexia (loss of appetite), and catatonia (stupor).

Normal persons taking these drugs, it was explained, often become apathetic, depressed, and lack initiative. They experience an isolation from environment.

Central Relaxants—The central relaxants, it was emphasized, unlike the other agents, do not affect the autonomic function in any way. They prolong barbiturate anesthesia only in large doses and then only on an additive basis. Strychnine hyperexcitability is not increased, but on the contrary, can be counteracted by meprobamate. In the electroencephalogram, a nonspecific sleep pattern is not produced, but discrete changes in the thalamic structures are noted.

Hostility in Animals Reduced—In monkeys, hostility is reduced. While in this state the animals retain interest in their environment and retain their appetite. Normal human beings not under tension observe no somatic or mental changes after the administration of these drugs.

Anxiety and Tension in Persons Reduced—The central relaxants have a marked relaxant effect on spastic muscles and hyperexcitable multineuronal reflexes. Persons suffering from anxiety and tension also observe a diminution of their symptoms that at times may be dramatic.

Adapted from News Release, *The New York Academy of Sciences* (October 19) 1956.

Nutrition in Pediatric Allergy

John P. McGovern, M.D. and Joseph I. Zuckerman, M.D.

Allergic Symptoms

(A) *Skin*—

(1) Recurrent attacks of urticaria.

(2) Pruritis without observable skin lesions.

(3) Atopic eczema.

(4) Various bizarre eruptions such as discrete, macular lesions which itch and excoriate so easily that they may be described as "blisters" by the patient.

(B) *Respiratory System*—

(1) Chronic or recurrent so-called allergic "colds."

(2) Chronic nasal obstruction, with or without watery discharge.

(3) Itching of the eyes and nose, especially common in children.

(4) Recurrent attacks of sneezing, frequently attributable by the patient to change in temperature.

(5) Paroxysmal attacks of croup, or croupy cough, more frequent in children but sometimes occurring in adults.

(6) Recurrent attacks of coughing without any evidence of infection and with or without mild wheezing.

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(7) Recurrent attacks of bronchial asthma.

(8) Redness and granulation of the palpebral conjunctivae that shows little change with time.

(9) Swollen, watery, pale inferior nasal turbinates with "pigskinning," at times without nasal symptoms, except "stuffiness."

(10) Residual wheezing brought out by deep breathing and coughing, or by forced expiration.

(C) *Central Nervous System*—

(1) Recurrent headaches, without definite pattern but more likely to occur during the night or early morning hours, usually frontal or generalized.

(2) Attacks of undue drowsiness which are generally foreign to patient; likely to occur after dinner in the evening preceding an attack of migraine.

(D) *Gastrointestinal System*—

(1) Belching, bloating, colic (frequent in children), chronic fullness, flatulence, attacks of mild nausea.

(2) Recurrent attacks of mild diarrhea.

(3) Regurgitation or retasting of food for some time after eating.

(4) "Heartburn" occurring chronically in adults and frequently associated with a major allergic disturbance.

(5) Celiac syndrome.

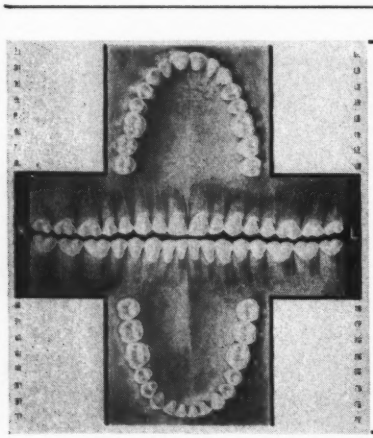
(E) *Musculo-Skeletal System*—

(1) Recurrent attacks of soreness, pain, and/or swelling about the joints, tendons, and muscles without fever.

(F) *Genitourinary System*—

(1) Attacks of frequency of urination, with or without pain and without apparent cause.

From *Borden's Review of Nutrition Research* **17**:31 (*May-June*) 1956.



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